Market Integration among Islamic Stock Indices: A Cross Country Analysis

By

Anum Fatima

91-FE/MS-IBF/F14

Supervisor **Dr. Atiq-uz-Zafar**

Assistant Professor, IIIE

Co supervisor **Dr Abdul Rashid**

Associate Professor, IIIE

International Institute of Islamic Economics (IIIE),

International Islamic University (IIU), Islamabad Pakistan

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Financial markets.
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A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR MS/M.PHIL. ECONOMICS SPECIALIZATION IN ISLAMIC BANKING AND FINANCE

Supervisor **Dr. Atiq-uz-Zafar**

Assistant Professor, IIIE

Co supervisor **Dr Abdul Rashid**

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International Institute of Islamic Economics (IIIE),

International Islamic University (IIU), Islamabad Pakistan

APPROVAL SHEET

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Accepted by the International Institute of Islamic Economics, International Islamic University, Islamabad, as partial fulfillment of the requirements for the award ofdegree ofMSin Islamic Banking and Finance.

Supervisor:

Dr. Atiq-uz-Zafar
Assistant Professor, (IIIE)
International Islamic University Islamabad

Co-Supervisor:

Dr Abdul Rashid
Associate Professor, IIIE
International Islamic University Islamabad

Internal Examiner:

Dr. Khaleeq-uz- Zaman
Consultant, IIIE
International Islamic University, Islamabad

External Examiner:

MuhamadMazhar Iqbal
Associate Professor
Quaid-i-Azam, University

Acting Chairperson
Department of Economics, Female campus
International Islamic University, Islamabad

Director
International Institute of Islamic Economics
International Islamic University, Islamabad

Date of Viva Voce: 19-05-2017

Dedication

This humble work is dedicated

To my parents for their overwhelming support and eternal love;

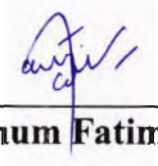
To my lovely nephews Mubashir and Mahd, who are my inspiration;

To my supervisors Dr. Abdul Rashid and Dr Atiq-uz-Zafar, for their persistent encouragements;

Declaration

I hereby solemnly declare that all material in this dissertation entitled as ***"Market Integration among Islamic Stock Indices: A Cross Country Analysis"*** submitted by me for partial fulfillment of the requirements of MS degree in Islamic Banking and Finance is purely my own original effort. I further declare that to the best of my knowledge, this dissertation contains no such material for which degree has been previously conferred upon or material previously published except where due references are made in the thesis.

Date: May 19, 2017



(Anum Fatima)

Acknowledgement

All praises to Allah, the most merciful and the most benevolent. I bow my head and heart in all humility and devotion to Almighty Allah who enabled me to achieve my goal. The completion of this piece of academic work is a moment of marvelous happiness for me.

I owe thanks to all those who supported me throughout this venture. I would like to thank my supervisors, Dr. Abdul Rashid and Dr Atiq-uz-Zafar, for their guidance and encouragement. It is a privilege to have both of them as my advisors. I benefit greatly from my interactions with them. I thank them for setting a high standard in research, and for their patience with me. I admire their intuitions and their encyclopedic knowledge. I express my gratitude for all my teachers and Department of Economics International Islamic University, Islamabad, for their continual support and for maintaining a good working atmosphere. I want to express my gratitude to internal and external evaluators who gave their precious comments to enhance the quality of this thesis.

Most of all the prayers of my affectionate parents and sisters, really opened the gates of success, encouragement and inspiring words along the way for me. Thank you to all my well-wishers, Alhamdulillah, I successfully accomplished this thesis.

Abstract

Financial integration referring to examination of linkages of financial markets in neighboring, regional and/or global economies is accompanied with several benefits and pose various risks. It is useful to monitor the integration among financial markets for market participation as well as for policy building.

This study traces the degree of integration in Islamic equity market with respect to mean and variance and explore asymmetric effects for 18 countries. We have performed pairwise analysis of daily Islamic stock returns of the selected countries for the period of July 2009 to July 2016. For exploring the integration between the selected Islamic stock markets with respect to mean and volatility, we have applied GARCH- mean model then the asymmetric impact is identified through EGRACH model.

The analysis indicates strong positive and negative integration among different countries with respect to mean in Islamic stocks. In case of integration at volatility level, we have noted that various muslim countries having Islamic stock markets like Malaysia, Pakistan, KSA, Qatar, Dubai, and Kuwait have great impact of Islamic stocks from non-muslim countries like Canada, China, UK, and Taiwan, in comparison to the impact from other muslim countries. Pairwise examination of volatality integration of Islamic stocks from non-muslim countries although, is significant but does not show any specific pattern. The examination of asymmetric impact show negative and significant leverage effects, expect Bharain, indicating greater volatility of bad news than good news. It indicates that positive shock have less impact than negative shocks of same magnitude and as the risk of business goes up, the investor's behavior will change and they may shift their funds to less risky investments. In case of Bahrain, Islamic stocks show positive and significant asymmetric impact indicating smaller volatility of bad news than good news.

List of Acronyms

AAOIFI	Accounting and Auditing Organization for Islamic Financial Institutions
ARIMA	Autoregressive Integrated Moving Average
ARCH	Autoregressive Conditional Heteroscedastic
CAPM	Capital Asset Pricing Model
CRSP	Center Research Security Prices
DJIMI	Dow Jones Islamic Market Index
GARCH	Generalized Autoregressive Conditional Heteroscedastic
E GARCH	Exponential Generalized Autoregressive Conditional Heteroscedastic
FTSE	Financial Times Stock Exchange
JB	Jarque Bera
SAC	Shariah Advisory Council
OECD	Organization for Economic Cooperation and Development
i.i.d	independent and identically distributed
KSA	Kingdom of Saudi Arabia
UK	United Kingdom
US	United States

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Chapter 1

Introduction

1.1 Background

Financial integration is a phenomenon which explore the linkage between financial markets in neighboring, regional and/or global economies are closely linked together. It is generally understood that financial integration is concatenated linked with several benefits, including development of markets and institutions and effective price discovery, leading to higher savings, investment and economic progress. At the same time, linkages among financial markets can pose various risks. It is realized that it is useful for countries to monitor the progress of intergration among financial markets for the sake of policy as well as market participants (Raj and Dhal, 2008).

Capital markets across countries or regions may show different degrees of integration. Market linkages mainly drive from the "law of one price" that identical assets (physical or financial) should bear the same price across countries after adjusting for transaction costs. The evidence recommends that significant capital market integration exists among major industrialized countries, therefore limiting the probable benefits from international diversification (Koutmos (1996), Sinquefield (1996), Ben Zion *et al.* (1996), Freimann (1998), and Bowe and Mylanidis (1999)). In contrast, linkages among emerging markets and other developed markets appear to be moderately weak (Korajczyk (1996), Hakim and Andary (1997), Nasser and Hajilee (2016) and Bekaert and Harvey (1995)). Under market segmentation, there may be significant benefits from financing in emerging markets, and a great deal of research has in fact looked into such possibilities (Errunza (1994), and Ben Zion *et al.* (1996)).

International financial integration has been an interesting area for many financial economists. It is now commonly opposed that the level of financial market integration around the world has increased significantly since the 1980s. Major reason of this development was the increased globalization of investments as investors become fully aware of the benefits of global portfolio diversification. However, during the 1980s, cross-border diversification was highly restricted to developed capital markets. While, international investors start to investing large amounts in some of the developing economies in East Asia, Latin America, Central and Eastern Europe, all of which had embarked on market-oriented reforms or deregulations to attract and absorb the excess foreign capital (Agénor, 2005).

Stock market integration includes various different features of the inter-relationships across national stock markets (Bracker *et al.*, 1999), which have been usually based on either asset pricing or statistical perspectives. International stock market integration has been the theme of considerable empirical investigation. The crises in stock markets has made investor realize that several national stock markets had become highly integrated that the developed markets, like the US market, have a strong impact on other smaller national stock markets. Analysis of international stock market movements recommends that there exists a strong interdependence between stock markets of developed economies.

Modern econometric tools are used for investigating volatility co-movement in financial integration, if the return or volatility of one financial market affects the other market's returns or volatility, it is known as spillover effect. The issue of volatility is not only a regional phenomenon, but also an integral part of global risk analysis. It is measured by volatility or variance. Volatility is a statistical measure of dispersion of returns for a specified security or market index. It can either be measured through the standard deviation or variance between returns from the same security or market index. Generally, the greater the volatility, the riskier is the security. In finance, return is a profit on an investment. It comprises of any changes in

value and interest or dividends or other such cash flows which the investor receives from the investment.The increasing economic integration of conventional financial markets has got importance since last three decades. The nature of integration among the Islamic stock markets are in main attention of equity market participants. The basic need for financial integration includes efficient capital allocation, better governance, higher investment and growth, and risk-sharing. The major factors behind this observed globalization are widespread growth of technology, easy capital flow and financial links between the economies. Financial integration whether of conventional or Islamic stocks can help capital-poor countries to differentiate from their production patterns that mostly depend on agricultural activities; this may reduce macroeconomic volatility and can provide great benefits for international risk-sharing (Kose, 2006, Lewis, 1999; Obstfeld, 1994; Van Wincoop, 1999). There are many studies about integration of conventional stocks but no such study is found about Islamic equity markets. That is why analysis of the across country analysis of Islamic stock is needed for financial institutes, portfolio managers and market players.

1.2 Motivation for the Study

There are many studies which focus on integration of stock markets conventional stocks. However, there are only few studies exploring Islamic stocks. Among these studies no study has been done which examines the integration of stock market and linkages between stock markets at returns and volatility level on each other country's stock. This study attempts to analyze the integration of stock markets at returns level and volatilities level of Islamic stock markets to fulfill the gap. Thus, the main motivation is to undertake this study to conduct a integrated analysis of returns and volatility of Islamic stocks at cross country level. We attempt to fill the gap by exploring tbe pairwise effect of a country's Islamic stock returns on another country's Islamic stock return. The pairwise effect of a country's Islamic stock returns volatility on another country's Islamic stock returns volatility is also examined. In addition, to

this study aims to investigate the asymmetric relation between stock returns and its volatility in the selected countries. To model the asymmetry in stock market volatility and to measure the different impacts on the conditional variance of bad and good news; the Exponential GARCH-In-Mean (EGARCH-M) model proposed by Nelson (1991) and Engle *et.al* (1987) are used in this study.

1.3 Objective of the Study

The main objectives of the study are

- To check integration among Islamic stock markets with respect to stock returns for selected countries.
- To check integration among Islamic stock markets with respect to stock returns volatility for selected countries.
- To find the asymmetric impact of positive and negative shocks on volatility.

1.4 Research Questions

The study attempts to address following research questions

- Are Islamic stock markets integrated with respect to stock returns for selected countries?
- Are Islamic stock markets integrated with respect to stock return volatility for selected countries?
- How positive and negative shocks affects on volatility of stocks?

1.5 Significance of the Study

In order to offer policy implications to obtain better and sustainable growth of Portfolio Investment flows, this study attempts to provide the foreign investor and policy makers a guide line for reduced portfolio risk and for designing such policy through which the financial market of the country can be protceted from complete or partial crises due to down trend in any other country's financial market because of integration with other country. This study also identifies

the effect of good and bad news on stock markets by analyzing positive and negative impact of the variation of asymmetric shocks and also provide a new field of research to researchers and academicians.

1.6 Plan of the Thesis

The structure of the study is Chapter 2 presents overview of development of Islamic stocks. It discusses the theoretical framework of how Islamic stock is screened and maintained. It also defined the criteria on which these stocks are selected. Chapter 3 provides a detailed literature review covering studies about Islamic stocks, and various methods used to analyze for integration of stocks returns. Chapter 4 comprises of methodology which is used in this study. It defines the constructions of required model according from generalized model. It also discussed data and its sources which are used. Chapter 5 includes the empirical results on integration of Islamic stock returns with respect to returns, volatility and asymmetric impact of positive and negative shocks on stock returns for selected countries. Chapter 6 is about conclusions, recommendation and future research.

Chapter 2

Development of Islamic Stock Indices

2.1. Introduction

The stock exchange is a place which gives the opportunity to trade in securities. The stock exchange is an organized security market, either regional or national in scope, where all buyers and sellers of securities can meet at a central location to transact purchases and sales. This section discusses criterion for the selection of Islamic stocks there can be no compromise on Shariah compliance, otherwise the product or service may not be deemed as acceptable.

Islam is a way of life for all Muslim followers. It is a comprehensive, integrative and holistic religion which governs all aspects of a Muslim's life covering all matters in this worldly life to the Hereafter. Islam encourages Muslims to have a balance between fulfillment of the Hereafter and worldly obligations. In today era, wealth means capital which financial means investment. People invest to get more money in the future. People believe that they can be wealthy if they invest their money wisely. Madun and Haniff (2013) defined investment as the current assurance of funds to one or more assets that will be held over some future time period. Investors believe that by sacrificing their present consumptions, they can anticipate to have greater consumption opportunities in the future. Since most investment promise return to be given in the future based on the risk assumed. There are two types of assets which investors can invest, real assets and financial assets (securities).

Acording to Hussein (2004) the Muslim investors were not involved in stock markets till 1970s' because of prohibition of certain business activities in which stock market are related. In 1987 there was discussion among eminent scholars and in 1990s' there was major breakthrough Islamic equity funds have start to operated. One of the famous Islamic market Dow Jones Islamic Market Index (DJIMI) was introduced in February 1999. There are some

restriction and criteria was developed through which these stock analyzed which was discussed later in this chapter.

The establishment of the Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI) which was established in 1990 is expected to ensure that participants conform to the regulations set out in Islamic finance. AAOIFI is an Islamic international non-for-profit corporate organization that formulates accounting, auditing, governance, ethics and Shariah standards for Islamic financial organizations and the industry there is no higher Shariah governing authority to monitor and ensure the current screening procedure is in accordance to AAOIFI (Mahfooz & Ahmed, 2014).

As Muslim investors (portfolio), one should always keep in mind that investments must be in accordance with the Shariah principles which prohibit the elements of *riba, maysir* and *gharar*. Prohibited activities according to shariah:

- Alcohol
- Gambling
- Conventional insurance
- Tobacco
- Pork associated products
- Pornography
- Conventional financial services
- Indecent Amusement

According to Mcgowan and Muhammad (2010), approximately 60 percent of the total population investments of Malaysian Muslim investors are in Shariah-based market segment. They also said that based on Shariah principles, Shariah-compliant securities have always been associated with not only *halal* or lawful practices, but also related to good image in the physical

context such as in quality, safety, environmentally friendliness, and process efficiency of the company who issues

Therefore, it is necessary to have a proper Shariah screening process in the financial market which enables investors to invest in companies that operate permissible business activities in Islam. This Shariah screening process will detect prohibited activities if existed and guide investors from embarking onto a non-compliant investment (Ho et al., 2012).

Shariah advisors board play an important role to guarantee the securities compliance status are being made according to the Shariah principles. This is to maintain investor's "trust and confidence. The Shariah supervisory boards should include of specialized jurists in Islamic commercial jurisprudence. According to Mahfooz & Ahmed (2014), the boards may include a member who is a professional in the field of Islamic financial institutions and with vast awareness of Fiqh al-Muamalat. The main responsibilities of the Shariah advisors in the boards are to set up Shariah guidelines and the structure for fund managers (mainly the Shariah stock screens firm selection). They also need to monitor the fund's activities to ensure adherence to the set guidelines, overseeing the fund's portfolio purification and advising or selecting the appropriate charities (Elfakhani, 2005).

In Pakistan, Al Meezan Investment Management has maintained this criteria and is rechecked by Islamic Financial Advisory division of Meezan Bank Limited and maintenance support is provided by Pakistan Stock Exchange. KMI is calculated on free floating methodology.

The Dow Jones Islamic Market Index (DJIMI) comprises of broad-market, blue-chip, strategy and thematic indices. They have qualified the conditions which depend on shariah criterion. The indices are the most noticeable and extensively used set of Shariah compliant benchmarks in the world. S&P Dow Jones Indices has contracted with Ratings Intelligence

Partners[1] (RI) to deliver the Shariah screens and filter the stocks grounded on these criterions. To find their entitlement for the indices, stocks are screened to guarantee that they fulfill the criterions established in the defined methodology. Organizations must follow Shariah requirements for acceptable products, business activities, debt levels, and interest income and expenses. By screening stocks for consistency with Shariah law, the indices help to reduce research costs and compliance concerns Muslim investors would otherwise face in constructing Islamic investment portfolios.

FTSE Shariah Global Equity Index Series is maintained by Financial Times Stock Exchange and the screening is then undertaken by Shariah consultants, Yasaar Limited[2], against a clear set of guiding principles. FTSE Shariah Global Equity Index Series has been fully certified as Shariah compliant through the issue of a Fatwa[3] (Islamic legal opinion) by Yasaar's principals. Yasaar Limited scholars represent all of the major Shariah schools of thoughts. But it follows more conservative approach to Shariah compliance in Asset-based debt screening criteria, by following debt ratio limits which are measured as a percentage of total assets, rather than more unstable measures that use 12-month irregular market capitalization. This guarantees that companies do not pass the screening criteria due to market price fluctuation, allowing the procedure to be less predictive and more in keeping with Shariah principles.

2.2. Screening Criteria

Shariah screening methodology was framed by the Shariah Advisory Council (SAC) of Securities Commission (SC) of Malaysia to help investors in recognizing Shariah compliant securities. This is to certify investors that their investments are in accordance with Shariah

[1] Ratings Intelligence Partners is a London/Kuwait-based consulting company specializing in solutions for the global Islamic investment market. Its team consists of qualified Islamic researchers who work directly with a Shariah Supervisory Board

[2] Yasaar's panels of high-profile Shariah scholars have extensive market expertise in all of the world's major financial centers

[3] To view this document visit http://ftse.jse.co.za/shariah.jsp

principles which protected by the elements of riba, maysir and gharar. The earlier methodology which was introduced in mid 1990s keeping in view the establishment of the Islamic capital market.

The methodology had recently been revised as an effort to harmonize the standard to global expectation with the introduction of the two-tier quantitative approach which applies the business activity benchmarks and the recently introduced financial ratio benchmarks, while existing qualitative assessment continues to be applicable.

2.3 Free - Float Methodology

We have selected stcoks follows free-float Methodology. The free-float Methodology of index construction is considered to be an industry best practice. Free-float means percentage of total shares issued by a company that are readily available for trading at stock exchange. It usually eliminates the shares held by regulatory directors, government and other locked-in shares not available for trading in the normal course. Free-Float can be used by the Exchange for regulatory purposes such as risk management.

2.3.1 Free-Float Calculation Method:

Total Outstanding Shares		*XXX*
Less: Shares held by Directors/sponsors	*XXX*	
Government Holdings as promoter/acquirer/ Controller	*XXX*	
Shares held by Associated Companies (Cross holdings)	*XXX*	
Shares held with general public in Physical Form	*XXX*	
Free-Float:	*XXX*	

2.4 Screening Rules

We have selected stcoks from Dow Jones Islamic Index, FTSE, S&P BSE 500 SHARIAH, Jakarta Islamic Index (JKII), Karachi Stock Exchange Meezan Index KMI, QE Al Rayan Islamic (QERI), and Tadawul All Share (TASI). Tadawul All Share (TASI) follows same criteria as FTSE, S&P BSE 500 SHARIAH and QE Al Rayan Islamic (QERI) follows same as Dow Jones Islamic Index. The basic criteria on which most of world's Islamic index select companies are as follows:

1. Business activity of the investment company.
2. Debt to total asset ratio.
3. Liquid assets as a percentage of total asset.
4. Investment in non shariah complaint activities.
5. Income from non shariah complaint activities.
6. Net liquid assed versus share price.

2.4.1 Business Activity of the Investment Company

It is an important criterion to analyze whether the stock is shariah complaint or not. The core business of company must be Halal and should not violate any principle of Shariah. It implies that the companies which involves haram (unlawful) business are not eligible. The companies which are involves in the business of alcohol related, pork product industry, and companies which deals in gambling, disseminating pornographic content, prostitution etc, are not permissible.

2.4.2 Debt to Total Asset Ratio

The limit on debt to total asset ratio defined by different Islamic index are:

- Dow Jones index Islamic index allows less than equals to 33%.
- Financial Times Stock Exchange (FTSE) allows less than equals to 33%.
- Meezan investment fund allows up to 37%.
- Securities Commission Malaysia allows less than equals to 33%.
- AAOIFI doesn't allow more than 30%.
- Jakarta Islamic Index (JKII) allows less than 45%
- QE Al Rayan Islamic (QERI) allows up to 33.3%
- Tadawul All Share (TASI) doest not greater than or equal to 33%

2.4.3 Liquid Assets as a Percentage of Total Assets

The limit on liquid Assets as a percentage of Total Assets defined by different Islamic index are:

- Dow Jones index Islamic index allows less than 33%.
- Financial Times Stock Exchange (FTSE) allows less than 33%.
- Meezan investment fund allows less than 25%.
- Securities Commission Malaysia allows up to 33%.
- AAOIFI allows less than 33%.
- Jakarta Islamic Index (JKII) allows less than 45%
- QE Al Rayan Islamic (QERI) allows less than 33%
- Tadawul All Share (TASI) doest not greater than or equal to 33%

2.4.4 Investment in Non Shariah Compliant Activities

Limits that are defined by different Islamic index are:

- Dow Jones index Islamic index allows up-to 30%.
- Meezan investment fund allows up-to 23%.
- Securities Commission Malaysia allows 5%-25% , depending upon type of activities,
    - 5% of mixed activates which are purely riba based.
    - 10% of mixed activates which are *umum balwa* (difficult to avoid).
    - 25% of mixed activates which are generally permissible but having element of masalah (public interest).

2.4.5 Income from Non Shariah Compliant Activities

Limit which is defined by different Islamic index on Income from non shariah compliant activities are:

- Dow Jones index Islamic index allows less than equals to 5%.
- Financial Times Stock Exchange (FTSE) allows less than equals to 5 %.

- Meezan investment fund allows less than equals to 5%.
- Securities Commission Malaysia allows less than equals to 5%-25%. Depending upon the nature of the activity.
    - 5% of mixed activates which are purely riba based.
    - 10% of mixed activates which are *umum balwa* (difficult to avoid).
    - 25% of mixed activates which are generally permissible but having element of masalah (public interest).

2.4.6 Net Liquid Assets versus Share Price

- Dow jones: The net liquid assets per share should be less than the market price of the share.
- Meezan: Market Price per share should be at least equal to or greater than net liquid assets per share. Net liquid assets per share is calculated by using the following formula:

$$Net\ Liquid\ Assets\ per\ Share = \frac{(Total\ Assets - Illiquid\ Assets - Long\ Term\ Liabilities - Current\ Liabilities)}{Number\ of\ Shares\ Outstanding}$$

2.5 Purification Requirement

It is essential to filter the earnings by deducting from the returns on the investments those earnings originating from an unacceptable source according to Shariah point of view. In framework of equity investment according to Shariah standards, it is obligatory to remove prohibited income that is mixed up with the earnings of the company and this is the responsibility of the owner of the shares. This removal is not obligatory for the intermediary, agent or manager to remove from their income /commission or wages because this is their right in lieu of the work they have undertaken. In case of Fund Management it is responsibility of the Management Company to eliminate the prohibited income.

According to Shariah Standards for the determination of the percentage of prohibited income the recourse should be the last verified financials position. It is calculated the percentage of non-compliant income to the gross revenue (sales + other income) for each investee company and this percentage is called as charity rate. Charity rate for each investee company is multiplied with the dividend income from respective companies to get the charitable amount. This charitable amount is then transferred to a separate account. Shariah advisor verifies the whole process of elimination of prohibited income and issues a certificate to be included in the annual accounts of the fund.

The different screening criterion are adopted by different indices around the globe should not be considered as the flaws or conflicts of the Muslim community or Islam itself. It is justified on the ground that Islam permits "flexibility" to suit specific circumstances confronted by Muslims in their unique environment such as the different economic, political, and social systems being practiced in their respective countries.

The Shariah Board of different indices have the freedom to exercise *ijtihad* as long as their rulings do not violate the principles of Shariah as mentioned in the Quran and Sunnah. But of course, the rulings must be supported by relevant authorities to justify the stand taken by the Shariah Board.

Chapter 3

Literature Review

3.1 Introduction

This chapter reviews the empirical literature concerning the financial integration of stock markets among various countries and regions. We have also discussed the studies determining the direction of association between stocks return volatility and stock returns. Stock market volatility and returns are also analyzed in the light of existing literature along with the volatility modelling and econometric developments reviewing the huge existing literature.

3.2. Integration of Stock Markets

Financial integration, or stock market integration at international level is only a recent phenomenon as national stock markets were not strongly correlated few years ago. A reasonable amount of research recommends that for the period before 1980s, international stock markets were segmented in nature with asset prices determined mainly by national factors (see for example, Stulz, 1981; Cho, *et al.* 1986; Wheatley, 1988; and Gultekin, *et al.* 1989).

Taylor and Tonks (1989) was the first to use the bivariate cointegration technique of Engle and Granger (1987) in order to examine whether the UK stock market was integrated into the American, German, Dutch and Japanese stock markets. Kasa (1992) has applied Johansen's (1988) multivariate cointegration method to five developed financial markets[4] in order to estimate the permanent and temporary components of stock price series and observed the presence of a single common stochastic trend as a driver of the cointegrated system. Bekaert and Harvey (1995) have studied the integration of the market change over time periods. They

[4] the U.S., the U.K., Japan, Germany and Canada

have used CAPM for interpretation for periods when national markets were segmented from world capital markets and when they became later integrated into the sample. They show that the degree of integration in developing markets is time varying and that several emerging markets have become more integrated at the end of the sample. Liu and Pan (1997) analyzed that the US market was more significant than the Japanese market in transmitting returns and volatilities to the Asian and Latin markets. They observed that the spillover effects were irregular over time and had significantly increased after the October 1987 stock market crash. Masih and Masih (1997) using the cointegration methods and Masih and Masih (1999) by applying vector error-correction and level VAR models have shown that the newly industrialized Asian countries of Honk Kong, Singapore, Taiwan and South Korea shared a long run relationship with the developed markets (the U.S., Japan, the U.K. and Germany).

Ravazzolo and Phylaktis (2000) have analyzed Pacific-Basin capital markets, and recognized lack of co-movement during the 80's for the free stock markets of Singapore and Hong Kong. Bilson *et al.* (2001) have identified that the local integration between stock markets in South Korea, Taiwan, Thailand, the Philippines and Malaysia was faster than their integration within the international market. Roca and Selvanathan (2001), using other econometric techniques, have shown that there are no short-term and long-term relationships between the stock markets of Australia, Hong Kong, Singapore and Taiwan. Masih and Masih (2001) have examined the exciting linkages between international stock markets. They identified significant interdependencies between the established OECD[5] and the emerging Asian Markets. More particularly, their results highlighted the management of the U.S and U.K markets both in the short and long term, regardless of the global financial crash of October 1987.

[5] OECD (Organization for Economic Cooperation and Development.)

Barari (2003) has compared the status of regional and global integration of six Latin American equity markets. Empirical evidences have revealed that integration is time-varying and suggested that, global stock market integration has increased relative to local stock market integration (Bekaert and Harvey (1997), Korajczyk, (1996), Baele & Inghelbrecht (2009)). Adler and Qi (2003) have studied the integration of the Mexican market into the North-American market. They generalized the model of Bekaert and Harvey (1995) in order to take the exchange risk into account and indentified reasonable integration along with significant and time-varying prices of the common and specific causes of risk. These results have been verified by several other studies, like, Bekaert and Harvey (1997). Lim *et al.* (2003) examined the relationships between stock markets in the Asian region by applying non-parametric cointegration techniques and identified that there is a common force which brings these markets together in the long run. These results were similar with the results by Wang and Nguyen Thi (2007) and Iwatsubo and Inagaki (2007).

Phylaktis and Ravazzolo (2005) have used multivariate cointegration methods to examine the stock market interactions among a group of Pacific-Basin countries and the industrialized countries of Japan and the US and found that although linkages have increased, there would be chance for long term gains when investing in Pacific-Asian markets but the Asian crisis did not have a significant effect on the degree of linkages of these markets.

Carrieri *et al.* (2006) studied Asian and Latin American emerging markets using a time-varying partially integrated CAPM and concluded that the majority of emerging markets are moderately integrated in the world market i.e. returns in these markets depend on the effects of both local and global risk factors and that their degrees of integration are time varying. However, the results of these studies are very sensitive to the validity of the CAPM and it is widely recognized that the tests of the domestic and international forms of this model are unfortunately inconclusive.

3.3 Studies Determining Positive Association between Stocks Return Volatility and Stock Returns

According to Sharpe (1964), Linter (1965) Mossin (1966) Merton (1973), the theoretical asset pricing models suggest a positive relationship between a stock portfolio's expected returns and volatility. Fisher (1966) has identified non-trading as a possible cause for this correlation. The expected return on a stock is found to be related to the covariances between its return and the return on a market portfolio (Black, Jensen and Scholes, 1972; Fama and MacBeth, 1973. In his intertemporal capital asset pricing model, Merton (1973) suggested a positive relationship between risk and expected return.

French *et al.* (1987) analyzed the relationship between stock returns and stock market volatility and identified that the estimated market risk premium is positively related to the predictable volatility of stock returns by use the GARCH-in-mean model. They also suggested that unexpected stock market returns are negatively related to the unexpected change in the volatility of stock returns. This negative relation shows indirect proof of a positive relationship between expected risk premiums and volatility. The intertemporal relation between risk and return has been examined also by Schwert and Stambaugh (1987) who have concluded that the data are consistent with a positive relation between conditional expected excess return and conditional variance. Atchison *et al.* (1987) have investigated the theoretical and empirical relationship between portfolio size and autocorrelation. They have suggested the other price adjustment delay factors in addition to the nonsynchronous trading being the cause of a significant positive serial correlation and attempted to find reasonable bounds for the serial correlation in the presence of non-trading. An anticipated pattern implies a profitable trading rule, rejecting an efficient market hypothesis. This evidence is stated by Fama and French (1988), and Poterba and Summers (1988) separately. Muthuswamy (1988) have suggested the causes of the serial correlation and attempted to find reasonable restrictions for the serial

correlation in the presence of non-trading. Lo and MacKin-lay (1988) have looked at the random walk hypothesis using variance ratio statistics for daily and weekly data. Their results not only implied that the stock prices do not follow random walks but also have identified that although these correlations are largely due to small stocks but they cannot be completely attributed to the effects of infrequent trading or time varying volatilities.

MacKinlay (1990) has suggested the causes of a significant positive serial correlation and tried to find reasonable constraints for the serial correlation in the presence of non-trading. Nelson (1991) modified the concept of Black (1976) that there is a relationship between returns and future volatility, and the asymmetric effect between positive and negative stock returns, the weighted innovation models such as exponential GARCH. Also found high persistence in the volatility of daily returns. Campbell and Hentschel (1992), Bansal and Lundblad (2002), Girard et al. (2001), Xing and Howe (2006), León et al. (2007) and Nyberg (2012) have reported a positive relationship between risk and return.

Yang *et al.* (2005) have examined the relationship between expected stock returns and volatility in the 12 largest international stock markets during January 1980 to December 2001. Consistent with most previous studies, they found a positive but insignificant relationship during the sample period for the majority of the markets based on parametric EGARCH-M models.

N'dri and Konan (2007) studied the relationship between expected stock market returns and volatility in the regional stock market of the West African Economic and Monetary Union called the BRVM. Using weekly returns for the period of 4 January 1999 to 29 July 2005, an EGARCH-in-Mean model assuming normally distributed and Student's t distribution for error terms, their study reveals that: 1) expected stock return has a positive but not statistically significant relationship with expected volatility. 2) Volatility is higher during market booms than when market declines. These result is conform to results found in mature markets but is

at odd with the positive and statistically significant risk-return tradeoff prescribed by finance theory. The result also shows that volatility is persistent but contrary to the EGARCH model of Nelson (1991), there is no leverage effect.

León et al. (2007) applied the mixed data sampling on several European stock indices including stock markets of France, Germany, Spain and the United Kingdom for the period, January 1988 to December 2003. They showed a significant positive relationship between expected market excess return and conditional variance. Nyberg (2012) used U.S. monthly data to study the risk–return tradeoff, but allowed for the state of the economy effect by taking the state of the business cycle into account. He recognized a positive relationship between the conditional mean and variance of returns regardless of the state of the business cycle. On the other hand, Baillie and DeGennaro (1990) used both monthly and daily Center Research Security Prices (CRSP) data on GARCH-in-mean (GARCH-M) model with conditional student t distribution and found no statistical significant relationship between stock expected return and its own volatility.

3.4 Studies Determining Negative Association between Stocks Return Volatility and Stock Returns

There is also a long tradition in finance that models stock return volatility as negatively correlated with stock returns (Black, 1976; Cox and Ross, 1976). Black (1976) have also studied the risk-return relationship and found that in case of decrease in stock prices for individual firms raises financial leverage i.e. firm's stock value falls relative to the market value of its debt, which results in an increase in debt-equity ratio and as a result, it is natural to expect that their stock becomes riskier, hence increase in the stock volatility is noted. This negative relationship between changes in volatility and stock returns is commonly known in the literature as the leverage effect.

The intertemporal relation between risk and return has been examined by several authors. Fama and Schwert (1977) have also found negative relation between these. Scholes and Williams (1977) and Dimson (1979) have worked on incorporating the non-trading effect in estimating capital asset pricing model (CAPM) and their betas. The expected return on a stock is found to be related to covariance between its return and the factors extracted from a multivariate time series of returns (Roll and Ross, 1980). Merton (1980) has estimated the relation between the market risk premium and volatility. Christie (1982) has also studied the risk-return relationship, found that stock prices declines for individual firm's raises financial leverage, which resulted in an increase in equity's volatility. A negative relationship between changes in volatility and stock returns was found. The leverage effect, a phenomenon relates to high volatility being induced by negative return, is also explored in detail. The magnitude of the negative relation between contemporaneous returns and changes in volatility is too large to be attributed solely to the effects of leverage has been discussed by Christie (1982). Campbell (1987) has also found a negative relation between returns and volatility.

The negative relation linear relation between the conditional mean and the conditional variance of the excess return on stocks is found by Breen, Glosten, and Jagannathan (1989). Nelson (1989) argued about conditional heteroscedasticity and Scheinkman and LeBaron (1989) discussed about non linearities in their respective work. Pagan and Hong (1991) also supported this negative relation between returns and future volatility. Cheung and Ng (1992) using EGARCH models also found evidence of a negative relationship between the log of the one-day-ahead conditional volatility and stock returns. They also analyze the relation between stock price dynamics and firm size. Their evidence shows that conditional future volatility of equity returns is negatively related to the level of stock price. Their results also reveal that this effect is stronger for small firms with higher financial leverage. Lawrence *et al.* (1993) find

support for a negative relation between conditional expected monthly return and conditional variance of monthly return, using a GARCH-M model.

Glosten *et al.* (1993) suggested that there is a negative relation between conditional expected monthly return and conditional variance of monthly return, using a GARCH-M model modified henceforth. It highlights that a negative shock to returns will generate more volatility than a positive shock of equal magnitude. They used daily data on stock index returns and found that large positive as well as negative unexpected returns lead to an upward revision in the conditional volatility, although negative shocks of similar magnitude lead to larger revision. Duffee (1995) claims that the reason for a negative relationship between stock returns and future changes in stock return volatility is that a positive stock return corresponds to an increase in current volatility. He tested this assertion and found a strong positive contemporaneous relation between firm stock returns and volatility, both using daily and monthly data in case of the U.S. Bekaert and Wu (2000) results depend on conditional CAPM model by using multivariate GARCH-in-mean parameterization for four portfolio from Nikkei 225 stocks shows a significant negative relationship between expected claim. These results lend some support to the claim of Whitelaw (2000) and Brandt and Qiang (2004). They found a strong and robust negative correlation between the innovations to the conditional moments leading to pronounced countercyclical variation in the Sharpe ratio. They documented significant lead-lag correlations between the moments that also appear related to business cycles. Also showed that although the conditional correlation between the mean and volatility is negative, the unconditional correlation is positive due to these lead-lag correlations. By using VAR process to study their simultaneous and intertemporal relationships in a flexible statistical framework and without relying on exogenous predictors. Some other studies are by Baillie and DeGennaro (1990), Glosten *et al.* (1993), Wang (2002) and Hibbert *et al.* (2008) who have reported the negative relation.

Pierre Giot (2005) analyzed that there is a negative and statistically significant relationship between the returns of the S&P 100 and the Nasdaq 100 stock indexes and their corresponding implied volatility indexes. Yang et al (2005) by using a flexible semiparametric specification of conditional variance found evidence of a significant negative relationship between expected returns and volatility in 6 out of the 12 markets. Hibbert et al. (2008) used daily and intraday data of SP 500 stocks to examine the short-term dynamics relation between return and changes in implied volatility. They documented a negative and significant relation and linked their results to the behavioral explanation of representativeness, affect and extrapolation bias as documented by Shefrin (2005, 2007).

Vliet *et al.* (2011) have resolved these apparently contradictory results by showing how methodological choices can lead to different, or even opposite conclusions. In duration of 1963-2009 U.S. sample they found that the empirical relation between historical volatility and expected returns is negative. Their results provide an empirical basis for low-volatility and minimum-variance investment approaches.

3.5 Stock Market Volatility and Returns

There are many studies analyzing the relation among macroeconomic volatility and returns stock market. A wide research has been done on the analysis of the sensitivity of stock returns toward risk and to the covariance of stock returns across different markets, the evidence suggests that, in addition to the traditional economic forces (Chen *et al.*, 1986) stock returns have been analyzed typically by employing time series models. Baillie and DeGennaro (1990) find the link between the return on the market portfolio and return (or the price change) of an asset to its own return variance. LeBaron (1992) explored the relation between serial correlation and volatility for several different stock return series at daily and weekly frequencies. It is found that serial correlations are changing over time and are related to stock return volatility. An extension to the GARCH model is proposed and estimate. In cross-country

studies, the findings of Kim and Rogers (1995), Koutmos and Booth (1995) Wei *et al.* (1995), show that national stock returns are significantly correlated and the relationship and international stock markets have grown more interdependent over time.

An extensive survey of the literature and report studies is conducted by El-Din and Hassan (2007) who have examined the volatility of the DJIM index returns and also find that the DJIMI is correlated with neither the Wilshire 5000 index nor the three-month Treasury bill. Rahim *et al.* (2008) found the Malaysian Islamic equity market to be weakly correlated with all the other markets, especially with the advanced markets. They also find returns of Islamic stocks traded in the Malaysian market are caused only by the US, Asia Pacific, World Emerging as well as World Developed stock returns

In cross-country studies, findings provided by Chiang and Jiang (1998) indicate that national stock returns are significantly correlated and the linkages among international stock markets have grown more interdependent over time. To find the relationship between stock returns and time-varying volatility Chiang and Doong (2001) investigated the time series behavior of stock returns for seven Asian stock markets using Threshold Autoregressive GARCH (1,1)-in-mean specification indicates as suggested by French *et al.* (1987). They find that four out of the seven Asian stock markets have a significant relationship between stock returns and unexpected volatility. Nasr *et al.* (2002) have estimated various volatility models using daily data of the Global Dow Jones Islamic Market World Index (DJIM). Stock market volatility in two African exchanges have been studied by Zakaria, *et al.* (*2012*); The analysis is based on using daily closing prices on the general indices in the two markets and employs different univariate specifications of the Generalized Autoregressive Conditional Heteroscedastic (GARCH) model, including both symmetric and asymmetric models. The empirical results show that the conditional variance (volatility) is an explosive process for the

Khartoum Stock Exchange index returns series, while it is quite persistent for the Cairo and Alexandria Stock Exchange (CASE) index returns series

3.6 Volatility Modelling and Econometric Developments

Financial market volatility is known to cluster such that a volatile period is known to persist for some time before the market returns to normality, only few argue with the proposition that stock market volatility changes randomly over time. Therefore, understanding the way stock market volatility changes is crucial. Econometric methods dealing with modeling of changing volatility are of keen interest over past several years. The first break-through in volatility modelling was proposed by Engle (1982) to capture volatility persistence in inflation. It was shown that conditional heteroscedasticity can be modeled using an autoregressive conditional heteroscedasticity (ARCH) model.

Bollerslev (1986) and Taylor (1986) independently suggested that the extension of ARCH model with an Autoregressive Moving Average (ARMA) formulation, with a view to achieving parsimony. The model is called the Generalized ARCH (GARCH) to analyze the link between the stock returns to risk factors. The GARCH models conditional variance as a function of its lagged values as well as squared lagged values of the disturbance term. Bollerslev *et al.* (1988) extended GARCH (1, 1) to a multivariate context to test a conditional CAPM with time varying covariance of asset returns. Following the nonlinearities, the standard deviation GARCH model is also suggested by Schwert (1989).

Nelson (1991) suggested Exponential ARCH model to handle these issues. To overcome the restrictions of original GARCH model Zakoian (1994) proposed Threshold GARCH (TGARCH), by allowing the conditional standard deviation to depend on sign of lagged innovation. The specification does not show parameter restrictions to guarantee the positivity of the conditional variance. However, to ensure stationarity of the TGARCH model, the parameters of the model have to be restricted and the choice of error distribution account

for the stationarity. TGARCH model is closely related to GJR-GARCH model developed by Glosten *et al.* (1993).

Ding *et al.* (1993) suggested that there is a long memory or mean reversion in stock returns. He further generalized the standard deviation GARCH to Power GARCH (PGARCH). Threshold Autoregressive GARCH or TAR-GARCH model by Glosten *et al.* (1993) and by Engle and Ng (1993) have explored advancements in econometric tools for handling financial time series data.

Rydberg (2000) argued that for applying ARCH models large lag values are required, so there is the need for many parameters. By indication issues of first order EGARCH model, Malmsten and Terasvirta (2004) argue that in normal errors it is not sufficiently flexible enough for capturing kurtosis and autocorrelation in stock returns. However, they recommend that the standard GARCH model could be improved by replacing the normal error distribution with a more fat-tailed error distribution.

The key advantage of EGARCH model over the symmetric GARCH model as identified by Rodríguez (2010) is that if there is no restrictions on the parameters, it will guarantee the positivity of the variance of log-transformed volatilities. He also argued that the stationarity of TGARCH model depends on the distribution of the disturbance term, which is usually assumed to follow Gaussian or student-*t* distribution.

Madaleno, and Pinho (2012) studied the time-varying pattern of price shock transmission, exploring stock market linkages using continuous time wavelet methodology. Their results show that the relation among indices was strong but not homogeneous across scales, and that local phenomenon's are more felt than others in these markets and there seems to be no quick transmission through markets around the world, but yes a significant time delay. Sharma and Seth (2012) have reviewed the present situation of research on stock market integration by reviewing the available literature, to give quick and easy access for future researchers. They

have classifies the past literature on stock markets integration and finds that the research work on the coverage of stock market integration across emerging economies has been increased during the recent time period.

The above review of literature suggests that a bulk of empirical investigation is done for the Integration of stock markets and volatility analysis of conventional stocks. Nevertheless, there is lack of literature on Islamic stocks on this issue. However many studies were undertaken which study different aspect of stock like comparison with conventional, performance. This leads to undertake a study that analyzes Integration of stock markets cross country analysis volatility in Islamic stock.

Chapter 4

Methodology and Data

4.1 Introduction

The spillover effect also termed as co-movement or information transmission in financial markets has remained at frontier in research related to financial sector since long. Exploring spillover effects means to investigate whether return or volatility of one financial market affects the other market's return or volatility it is quite important to analyze information transmission between the financial markets, as due to information transmission the dynamic linkages are developed between the financial markets. Volatility spillover usually results from the interdependence among market economies. This interdependence refers to the transmission of local or global shocks across countries because of their financial linkages i.e. volatility spillover examines the spread of market disturbances from one country to another, a process observed through co-movements in stock prices, exchange rates, or capital flows (Dornbusch and Claessens, 2000). Padhi and Lagesh (2012) have found that information transmission mechanisms persists through return and volatility and it plays a significant role in determining the distribution and financial integration across the global financial markets. The understanding and predictability of spillover effect and volatility modeling are significantly important for asset allocation, strategies of global hedging and pricing of internal securities

Abou-Zaid (2011) by investigating the international transmission of daily stock index volatility movements from the United States and the United Kingdom to Egypt, Israel, and Turkey has highlighted the importance of study of cross-border relationships. Especially with increasing global financial integration, the occurrence of changes in one market leading to spillovers in others both in terms of returns and volatility emphasizes the need for examining

the co-movements. This integration was often strengthened through the formation of free trade areas or increasing trade volume among countries.

Many studies focus on integration of stock markets with respect to returns and volatilities of conventional stocks, but only few explore Islamic stocks. Research work on integration and linkages between Islamic stock markets with respect to returns and volatility on across countries stocks is not known to us. This motivates us to undertake a study that provides integrated analysis of returns and volatility of Islamic stocks at cross country level. We attempt to fill the gap by exploring the pairwise effect of country's Islamic stock with respect to returns and volatility on other country's Islamic stock market returns. Also aims to investigate the asymmetric impact of shocks on volatility in the selected countries.

The current study attempts to answer the questions framed as are Islamic stock markets integrated with respect to returns for selected countries? Are Islamic stock markets integrated with respect to volatility for selected countries? What are the asymmetric impacts on Islamic stock markets? By exploring the integration among Islamic stock markets with respect to returns and volatility for selected countries. Moreover, the asymmetric impact of positive and negative shocks on volatility in Islamic stock markets is also explored. In order to achieve the objectives, in this chapter we have investigated the data series at hand in detailed. Initializing the analysis with graphical visualization as these graphical illustrations provide first-hand knowledge about the characteristics of data at hand, help in understanding the behavior of the time series and indicate the stationary condition. It is then added by the descriptive statistics for numerical investigation of the characteristic of the return series. After that models are employed for volatility and spillover effect. To check the mean spillover effect between two series, the return series of one market is introduced as regressor in other market return series. For volatility spillover effect the square of return series of one market is introduced as regressor in the conditional variance equation of other market. The residuals analysis is carried out for

the validity for employed model. For detailed econometric analysis we need to support it with a number of statistical tests which are elaborated in next section.

4.2 Pre Estimation Diagnostic Analysis

Exploring the patterns and relations of stock market indices from various countries has been practiced since long and from the existing evidences in the literature, it is argued that these have nonlinear behavior. For the Islamic stock indices, we start with graphical evaluations and support these with descriptive statistics. As we intend to explore the relationships and the market structure at high frequency i.e. using daily data, we observe the descriptive statistics in terms of mean, median, standard deviation, skewness, kurtosis and Jarque Bera test. The financial time series generally exhibits high standard deviation with positive excess kurtosis referring leptokurtic behavior. This implies that the distribution of the stock indices tends to contain extreme values. This also indicates the possibility of non-normal distribution which is explored by Jarque-Bera test with the null hypothesis that observed series is normal and its rejection refers that the stock indices are non-normal. If found, the large gap between the maximum and the minimum indicates that the Islamic stock market undergoes large fluctuations which may be due to smallness and openness of the stock market and vulnerability to global shocks.

Stock prices are generally expressed in absolute terms carrying their local currency units making comparisons complicated. Secondly, the financial series at level are trendy in nature making difficult the identification and estimation of a robust model. Thirdly, in technical terms, these stock prices are observed as nonstationary; therefore, to deal with trend it becomes necessary to convert the raw data series in returns. We use

$$R_{it} = \ln P_t - \ln P_{t-1}$$

P_t: Current day (t) price of Islamic stocks
P_{t-1}: Previous day (t-1) prices of Islamic stocks

R_{it}: Current day (t) returns on Islamic stocks of i^{th} country

Repeating the exercise of initial analysis, we start by graphical exploration of the return series over the observed time interval for possible examination of stationary behavior and existence of any outliers. It is then supported by descriptive statistics which also contains the calculation of Mean, Median, Standard deviation, skewness, kurtosis and Jarque Bera test. Most of the econometric modelling comprising of linear models assumes that the time series at hand show stationary behavior in mean and variance and secondly, the expected value of all error terms when squared, is the same at any given point i.e. homoscedastic. Therefore, for modelling we need to examine some basic conditions, namely stationarity and existence of heteroskedasticity.

4.2.1 Stationarity Tests

In any time series analysis the analysis starts by the examination of stationarity condition as otherwise it can strongly influence its behavior and properties -e.g. persistence of shocks will be infinite for nonstationary series leading to spurious regressions and invalid asymptotic analysis.

Unit root tests are used to determine if trending data should be first differenced or regressed on deterministic functions of time to render the data stationary. Hence, pre-testing for unit roots is often a first step in the econometric modeling. There are many different tests determining the stationarity status of the observed time series. The most commonly used stationarity testis the KPSS test due to Kwiatkowski, Phillips, Schmidt and Shin (1992). In our analysis we have also used the KPSS test for the diagnosis of stationarity. The null and alternative hypotheses are

$$H_0: series\ is\ stationary$$

$$H_1: series\ is\ non\ stationary$$

Assuming that we can decompose the series into the sum of a deterministic trend, a random walk, and a stationary error with the following linear regression model $y_t = \beta t + \varepsilon_t + \gamma_t$ where, γ_t is a random walk, i.e., $\gamma_t = \gamma_{t-1} + \mu_t$, μ_t is *i.i.d* $N(0, \sigma_\mu^2)$, βt is a deterministic trend, and ε_t is a stationary error. The hypothesis is tested using the statistic defined as the Lagrange multiplier (LM) or score statistic of the form $KPSS = N^{-2} \sum_{t=1}^{N} {S_t^2}/{\hat{\sigma}_{(p)}^2}$ *where* $\hat{\sigma}_{(p)}^2 = \frac{1}{N} \sum_{t=1}^{N} e_t^2 + \frac{2}{N} \sum_{j=1}^{p} \omega_j (p) \sum_{t=j+1}^{N} e_t e_{t-j}$,

p *is the truncation lag,* $\omega_j(p)$ is an optional weighting function that corresponds to the choice of a special window. The upper tail critical values of the asymptotic distribution of the KPSS statistic are given by Kwiatkowski et al. (1992). For employing econometric model, series should be stationary. It means null hypothesis should not be rejected, which required that the estimated value of KPSS should be less than the critical value of KPSS[6] or the p-value should be greater than 0.05.

4.2.2 Existence of Heteroskedasticity

Form the existing empirical evidence; it is found that usually financial time series are subjected to heteroskedasticity which is usually autoregressive in nature. Gourieroux (1997) has shown that ARIMA models are inappropriate for financial data. A general procedure to handle the financial data showing excess of kurtosis and volatility clustering is by using GARCH model or more effectively by t-distributed GARCH model as suggested by Ballerslevr (1987) which are the generalized extension of ARCH (q) models suggested earlier by Engle (1982). Second condition for employing any model requires that there is no heteroskedasticity in the error term. Although the error term is unavailable but the ARCH LM Test is applied for the estimated residuals to check the existence of heteroskedastic residuals. The ARCH LM Test carries out Lagrange multiplier tests to test whether the standardized residuals exhibit

[6] Critical values are (1%, 5%, 10%:= 0.739, 0.463, 0.347)

additional ARCH. If the variance equation is correctly specified, there should be no ARCH left in the standardized residuals. GARCH is the presence of ARCH effect in series, for which we will apply ARCH-LM test (Lagrange multiplier) for the hypotheses as

$$H_0: no\ ARCH\ effect$$

$$H_1: ARCH\ effect\ is\ present$$

There should be the presence of ARCH effect in series so that we can apply GARCH model. It requires that null hypothesis should be rejected, which means there is ARCH effect. If there is no ARCH effect then there is no use to apply GARCH model as it is used to Capture ARCH effect or for studying the heteroskedasticity patterns.

4.3 Econometric Methodology and Model Specification

There are dozens of univariate and multivariate models examining the linear and non-linear behavior of stock market. However, from the evidence of literature, it is noted that the financial data generally have patterns such that the variances of the error terms are expected to be larger for some points or ranges of the data than for others as some time periods are riskier than others resulting in heteroskedasticity and "volatility clustering". Noting the heteroskedastic behavior we move toward GARCH modelling. As the GARCH (p, q) univariate models are capable of exploring better volatility dynamics. The GARCH models treat heteroskedasticity as a variance to be modeled. Introduced by Bollerslev (1986), the GARCH model is a weighted average of past squared residuals with declining weights which never go completely to zero. It gives parsimonious models which are easy to estimate and has proven surprisingly successful in predicting conditional variances. The GARCH model is initiated under some basic assumptions among which one is stationarity checked by a number of tests available in literature. As the daily data is used, we refer here KPSS test and require that for employing GARCH model, series should be stationary. After verifying the stationarity condition we observe the existence of heteroskedasticity by applying ARCH-LM test

(Lagrange multiplier test) as the GARCH requires the presence of ARCH effect in series. After the initial examination of the series at hand, we move toward formal modelling. To avoid any non-convergence problem in this study we employ appropriate univariate GARCH type model such as GARCH (p, q) and EGARCH to estimate volatility models and to explore mean and volatility spillover effect as these models are capable of exploring better volatility dynamics.

4.3.1 GARCH (Generalized AutoRegressive Conditional Heteroskedasticity)

The GARCH (p,q) model is developed by Bollerslev (1986) where *(p)* is the number of lags of the conditional variance GARCH and (q) linear ARCH. Conditions on the parameters to ensure that the GARCH(p,q) conditional variance is always positive are given in Nelson and Cao (1992). The Generalized autoregressive conditional heteroscedastic (GARCH) model is the generalized extension of the ARCH (q) model overcoming the problems of long lag length 'q' causing increased number of parameters and loss of degree of freedom and secondly, non-negativity condition of parameters.

The general description of GARCH model comprises of two parts:

1. Conditional mean equation

2. Conditional variance equation

4.3.1.1 Conditional Mean Equation

The very important and initial step is to construct a proper conditional mean equation. Our first objective is associated with the mean equation as this equation is required to check integration among Islamic stock markets with respect to returns for selected countries. The equation is the form of AR (auto regressive) and/or MA (moving average) terms. The basic mean equation is written as

$$R_{it} = \alpha_0 + \varepsilon_t \qquad (4.1)$$

where $\varepsilon_t \sim N(0, \sigma_t^2)$. The equation (4.1) is known as ARMA (0,0) which means that there is no ARMA terms. R_{it} show returns of the domestic country, α_0 is Constant and ε_t is the error term. If there is only AR term making it as ARMA (1,0) and it shows that returns are regressed on their one pervious lag values (R_{it-1}). We can write this equation (4.2) as follows

$$R_{it} = \alpha_0 + \alpha_1 R_{it-1} + \varepsilon_t \quad (4.2)$$

The ARMA (1,1) shows that there is returns are regressed on their one pervious lag values, and one pervious lag error term (ε_{it-1}) which shows in equation (4.3)

$$R_{it} = \alpha_0 + \alpha_1 R_{it-1} + \alpha_2 \varepsilon_{it-1} + \varepsilon_t \quad (4.3)$$

Similarly ARMA (2,1) can be written in equation(4.4) as

$$R_{it} = \alpha_0 + \alpha_1 R_{it-1} + \alpha_2 R_{it-2} + \alpha_3 \varepsilon_{it-1} + \varepsilon_t \quad (4.4)$$

It means that returns are regressed on their one and two pervious lag values, and one pervious lag error terms. Now ARMA (2,2) means that returns are regressed on their one and two pervious lag values, and one and two pervious lag error terms can be written as in equation (4.5)

$$R_{it} = \alpha_0 + \alpha_1 R_{it-1} + \alpha_2 R_{it-1} + \alpha_3 \varepsilon_{it-1} + \alpha_4 \varepsilon_{it-2} + \varepsilon_t \quad (4.5)$$

For further ARMA (p, q) model the general equation can written in which required lag will be used for analysis according to the requirement. As (4.6)

$$R_{it} = \alpha_0 + \sum_{s=1}^{m} \alpha_l R_{i\,t-s} + \sum_{d=1}^{n} \alpha_k \varepsilon_{it-d} + \varepsilon_t \quad (4.6)$$

To fulfill our objective i-e to monitor the effect of one country's returns on other country's (foreign country) returns. We will add the returns of foreign country R_j, in equation (4.6) as in equation (4.7)

$$R_{it} = \alpha_0 + \alpha_l R_j + \sum_{s=1}^{m} \alpha_h R_{i\,t-s} + \sum_{d=1}^{n} \alpha_k \varepsilon_{it-d} + \varepsilon_t \quad \because \begin{matrix} i = 1,2,3 \ldots 18 \\ i \neq j \\ j = 1,2,3 \ldots 17 \end{matrix} \tag{4.7}$$

where

t is: time period

R_{jt}: is return of other country j *(foreign country)*

R_{it} : is returns of the country i (*domestic country)*

$\sum_{s=1}^{m} \alpha_3 R_{i\,t-s}$: Sum of AR terms,

s : is number of lags of values,

$\sum_{d=1}^{n} \alpha_4 \varepsilon_{it-d}$: Sum of MA terms,

d: is number lags of error terms

4.3.1.2 Conditional Variance Equation

The second part of GARCH (p, q) is conditional variance equation. This equation is used for second objective. This equation is required to check integration among Islamic stock markets with respect to volatility for selected countries. The equation is the combination of ARCH and GARCH terms.

$$\sigma_{it}^2 = \theta_0 + \theta_1 \varepsilon_{it-1}^2 \tag{4.8}$$

This is GARCH (0,1) equation (4.8) ε_{it-1}^2 is the one term pervious error squared known as ARCH Term

$$\sigma_{it}^2 = \theta_0 + \theta_1 \varepsilon_{it-1}^2 + \theta_2 \sigma_{it-1}^2 \tag{4.9}$$

The above equation i.e equation 4.9 is GARCH(1,1) one period pervious error squared (ARCH Term) and σ_{it-1}^2 is the one period pervious volatility of domestic country and is known as GARCH term. The GARCH(2,1), where two GARCH terms and one ARCH term is included can be can be written as equation (4.10)

$$\sigma_{it}^2 = \theta_0 + \theta_1 \varepsilon_{it-1}^2 + \theta_2 \sigma_{it-1}^2 + \theta_3 \sigma_{it-2}^2 \tag{4.10}$$

And the GARCH(2,2) can be written as in below equation (4.11).

$$\sigma_{it}^2 = \theta_0 + \theta_1 \varepsilon_{it-1}^2 + \theta_2 \varepsilon_{it-2}^2 + \theta_3 \sigma_{it-1}^2 + \theta_4 \sigma_{it-2}^2 \tag{4.11}$$

The generalize form of GARCH (p, q), in which required GARCH and ARCH terms would be adjusted is shown in equation(4.12). It is a compulsory condition for GARCH equation that ARCH and GARCH terms must be positive and their sum should be ≤ 1.

$$\sigma_{it}^2 = \theta_0 + \sum_{l=1}^{q} \theta_d \varepsilon_{it-l}^2 + \sum_{h=1}^{p} \theta_k \sigma_{it-h}^2 \tag{4.12}$$

For meeting the objective of our study we need to add the other country effect as well in equation (4.12) after which the new form of equation (4.13)

$$\sigma_{it}^2 = \theta_0 + \sum_{l=1}^{q} \theta_l \varepsilon_{it-l}^2 + \sum_{h=1}^{p} \theta_f \sigma_{it-h}^2 + \theta_r \sigma_{jt}^2 \text{ where } \because \begin{matrix} i = 1,2,3 \ldots 18 \\ i \neq j \\ j = 1,2,3 \ldots 17 \end{matrix} \tag{4.13}$$

t : is time period

σ_{it}^2 : is volatility of country i *[domestic country]*

$\sum_{l=1}^{q} \theta_l \varepsilon_{it-l}^2$: Sum of the pervious error square *[ARCH Terms]*

l is number required ARCH terms

$\sum_{h=1}^{p} \theta_k \sigma_{it-h}^2$: Sum of the pervious volatility of country *i* (*domestic country)[GARCH term]*

h number required GARCH terms

σ_{jt}^2 : is volatility of country *j(foreign country)*

According to the "Efficient Market Hypothesis (EMH)" R_t shows mean return behavior and is unpredictable. In conditional variance equation the restriction on coefficients is that they must be non-negative. σ_t^2 represents conditional variance which depends upon lags of ε_t^2 squared past value of ε_t process.

4.3.2 EGRACH (Exponential GARCH)

To capture asymmetric effects of good and bad shocks on volatility in Islamic stock market we move toward EGARCH as the general GARCH type models deals with the symmetric impact of bad and good news on volatility only and fails to grasp asymmetric impact. In financial econometrics literature Asymmetric GARCH type models consider the asymmetries of response to bad or good news and account for leverage effect. Leverage refers the negative correlation between the assets returns and the volatility of the assets return (Black 1976), which indicates the magnitude of bad and good news are different. The third objective is to analyze the asymmetric impact of positive and negative shocks on volatility in Islamic stock markets. The EGARCH model was developed by Nelson (1991). They deals with asymmetries in the relationship between return and volatility. The negative shocks will obviously have a stronger influence on volatility than positive shocks of the same degree. This effect, is often mentioned as a "leverage effect," although it is now generally considered that the seemingly asymmetry has very less connections with actual financial leverage. EGRACH model relaxes the complication of restrictions which are imposed on GRACH model (i.e.

process remains positive). The EGARCH(p,q) model in which *(p) is the* GARCH and *(q) is the* ARCH term.

$$log\sigma_{it}^2 = \gamma_0 + \gamma_1 \left|\frac{\varepsilon_{t-1}}{\sqrt{\sigma_{t-1}}}\right| + \gamma_2 \left[\frac{\varepsilon_{t-1}}{\sqrt{\sigma_{t-1}}}\right] + \gamma_3 log\sigma_{it-1}^2$$

(4.14)

Equation (4.14) is EGARCH (1,1) where

σ_{it}^2 : is volatility of country *domestic country*

$\left|\frac{\varepsilon_{t-1}}{\sqrt{\sigma_{t-1}}}\right|$: ARCH term

$\left[\frac{\varepsilon_{t-1}}{\sqrt{\sigma_{t-1}}}\right]$: Standardized form of ε_{it-1}^2 is the pervious error square (asymmetric term)

$log\sigma_{it-1}^2$: (GARCH Term)

EGARCH (1,2) and EGARCH(2,1) can be written equation (4.15) and (4.16)

$$log\sigma_{it}^2 = \gamma_0 + \gamma_1 \left|\frac{\varepsilon_{t-1}}{\sqrt{\sigma_{t-1}}}\right| + \gamma_2 \left|\frac{\varepsilon_{t-2}}{\sqrt{\sigma_{t-2}}}\right| + \gamma_3 \left[\frac{\varepsilon_{t-1}}{\sqrt{\sigma_{t-1}}}\right] + \gamma_4 log\sigma_{it-1}^2$$

(4.15)

And

$$log\sigma_{it}^2 = \gamma_0 + \gamma_1 \left|\frac{\varepsilon_{t-1}}{\sqrt{\sigma_{t-1}}}\right| + \gamma_2 \left[\frac{\varepsilon_{t-1}}{\sqrt{\sigma_{t-1}}}\right] + \gamma_3 log\sigma_{it-1}^2 + \gamma_4 log\sigma_{it-2}^2$$

(4.16)

The generalized form of EGARCH (p,q) can be written as

$$log\sigma_{it}^2 = \gamma_0 + \sum_{g=1}^{q} \gamma_l \left|\frac{\varepsilon_{t-g}}{\sqrt{\sigma_{t-g}}}\right| + \gamma_h \left[\frac{\varepsilon_{t-1}}{\sqrt{\sigma_{t-1}}}\right] + \sum_{k=1}^{p} \gamma_d log\sigma_{it-k}^2$$

(4.17)

In our study we tend to examine the asymmetric impact of stock of Islamic stock of one country. Now equation becomes as follow

$$log\sigma_{it}^2 = \gamma_0 + \sum_{g=1}^{q} \gamma_l \left|\frac{\varepsilon_{t-g}}{\sqrt{\sigma_{t-g}}}\right| + \gamma_h \left[\frac{\varepsilon_{t-1}}{\sqrt{\sigma_{t-1}}}\right] + \sum_{k=1}^{p} \gamma_d log\sigma_{it-k}^2 + \gamma_r \sigma_{jt}^2$$

(4.18)

Where

$log\sigma_{it}^2$: log of volatility of country *i domestic country*

$\sum_{g=1}^{q} \gamma_l \left|\frac{\varepsilon_{t-g}}{\sqrt{\sigma_{t-g}}}\right|$: Sum of ARCH terms,

g: number Arch terms

$\left[\frac{\varepsilon_{t-1}}{\sqrt{\sigma_{t-1}}}\right]$ Standardized form of $\varepsilon_{it-1}^2$is the pervious error square (asymmetric term)

$\sum_{k=1}^{p} \gamma_d \, log\sigma_{it-k}^2$: Sum of GARCH Terms,

k :is number of GARCH terms

σ_{jt}^2 : is volatility of country *j foreign country.*

4.4 Post Estimation Residual Diagnostic Test

After identifying the model and estimating the required objectives, it is necessary to check that model is correctly specified or not. Diagnostic test are Lagrange Multiplier (LM-ARCH) test, Ljung- Box on squared (Q^2 -test) and Ljung- Box on Raw series (Q-test). These test are applied on the residual of estimated model to identify remaining ARCH effect. Our study requires that there should be no ARCH effect remaining for the specified model.

4.5 Data and Sample Period

Data of Islamic indices will be collected from the websites of Google Finance, Yahoo finance, Pakistan Stock Exchange and Dow Jones Islamic Index of different countries. The data set used is on daily frequency for the duration of July 2009 to July 2016. We have selected total of 18 countries such that 9 Muslim and 9 non Muslim countries. These countries are as follows;

No.	Countries	Index
1	Bahrain	Dow Jones Islamic Market Bahrain Index
2	Canada	Dow Jones Islamic Market Canada Index
3	China	Dow Jones Islamic Market China Index
4	Dubai	FTSE NASDAQ Dubai 10 Shariah
5	India	S&P BSE 500 SHARIAH

6	Indonesia	Jakarta Islamic Index (JKII)
7	Japan	Dow Jones Islamic Market Japan Index
8	Kuwait	Dow Jones Islamic Market Kuwait
9	Malaysia	Dow Jones Islamic Market Malaysia Index
10	Pakistan	Karachi Stock Exchange Meezan Index KMI
11	Qatar	QE Al Rayan Islamic (QERI)
12	Saudi Arabia	Tadawul All Share (TASI)
13	Sri Lanka	Dow Jones Islamic Market Sri Lanka
14	Taiwan	FTSE TWSE Taiwan Shariah (FTTWSH)
15	Thailand	FTSE SET Shariah (FTFSTSH)
16	Turkey	Dow Jones Islamic Market Turkey Index
17	UK	Dow Jones Islamic Market U.K. Index
18	US	Dow Jones Islamic Market U.S. Index

Chapter 5

Empirical Analysis

5.1 Introduction

After reviewing existing the literature and empirical frame work, we now analyze our estimated results to address our objectives as mentioned in Chapter 1. The outline of this chapter is as follows: first we will discuss pre estimation test, second our estimated results, third is conclusion. We have selected daily stock prices of Pakistan, Sri Lanka, Indonesia, Turkey, Qatar, Taiwan, India, Kuwait, Malaysia, Canada, Kingdom of Saudi Arabia (KSA), Thailand, the United Kingdom (UK), the United States (US), Japan, Greater China, Bahrain, and Dubai for the time period of July 2009 to July 2016

5.2 Pre Estimation Results and Descriptive Statistics

The basic assumption of GARCH models, we first apply KPSS test to find the stationarity on Islamic stock prices. Null hypothesis is rejected which means as is not stationary. Its results for all observed stock prices are shows in Table 5.1 in Appendix B. The graphs also support the results showing upward trend as well as non-constant mean and variance and indicating that the series are not stationary. Here we present graphs of two countries and rest are given in Appendix A.

To remove the existence unit root and to make the series stationary, we calculate returns of series by taking log of the prices, and then taking first difference. For return series the existence

ForP_t: stock prices in time period t, P_{t-1}: stock prices in time period t-1, $\ln P_t$ *and* $\ln P_{t-1}$ are the log values for respective stock prices. We define returns as

$$R_{it} = \ln P_t - \ln P_{t-1}$$

Then again KPSS test is applied in Table 5.2 in Appendix B. The null hypothesis is not rejected which means series is stationary at its usual level of significance. And the graphs showing series are stationary, only for two countries and other and are in appendix.

The graphical analysis indicates stationary in mean however, we can identify the non-constant or varying variance over the observed time period. This indicates the existence of heteroskedasticity we need to check it by some statistical test. We have applied ARCH test to identify existence of ARCH effect. Table 5.2 in Appendix B shows that all countries Islamic stock indices returns have ARCH effect, i-e we reject null the hypothesis of no heteroskedasticity.

The descriptive statistics is preasented in Table 5.3.in Appendix B. It shows all countries having positive mean return expect SriLanka, Malaysia, Kuwait, KSA, and India. Skewness[7], Kurtosis[8] and Jarque Bera (JB[9]) test show that all countries Islamic stock indices returns are non-normal. They are negatively skewed for all country expect SriLanka and Dubai. JB test shows rejection of null hypothesis as it has significant P-value indicating series is not normal.

5.3 Estimation Analysis

As Table 5.2 in Appendix B shows that our series have ARCH effect so GARCH model can be applied to estimates conditional mean and variances. The bivariate analysis proceeds with ARIMA identification Table 5.4 in Appendix B show identified ARMA models which we have used for bivariate analysis in presence of ARCH effect. Now we discuss empirical results of bivariate analysis of countries one by one based on equation 4.7 and 4.12.

[7] Skewness H_0: *the series is symmetric* H_1: *the series is not symmetric*
[8] E*xcess* Kurtosis -3 >3 means series is leptokurtic,
[9] JarqueBera H_0: *the series is normal* H_1: *the series is non normal*

5.3.1 Integration among Islamic stock markets with respect to Returns and Variance for selected countries.

1. Pakistan

The bivariate analysis of Pakistan with other countries the empirical results from table 5.5 implies that there is significant mean spillover from Pakistani Islamic stock market to all other countries in the study. However, our empirical result doesn't supports mean spillover effect for Bahrain. The significant AR terms mean the current return of markets are only dependent upon lag values. In addition there is positive variance spillover for Canada, China, India, Indonesia, Japan, Malaysia, SriLanka, Turkey, UK, US, Qatar, KSA, Bahrain and Taiwan and negative volatility spillover effect of Kuwait and Dubai Islamic stocks. However Islamic stocks of Thailand have no significant impact on volatility of Pakistani Islamic stocks. ARCH and GARCH terms in conditional variance equations are significant which indicate the existence of ARCH and GARCH effect in return series and is captured. The persistence of shocks of the most of them are not closer to 1 show presence of ARCH and GARCH effects with short time for decay.

2. Malaysia

There is significant mean spillover from Malaysian Islamic stock market to all other countries in the study as shown in the analysis of Malaysia with other countries in Table 5.6. The significant AR terms shows the current return of markets are only dependent upon lag values. There is positive variance spillover for Canada, China, SriLanka, US, KSA, Taiwan, Bahrain, and Thailand and negative volatility spillover effect of India Islamic stocks. However Islamic stocks of other countries in the study have no significant impact on volatility of Malaysian Islamic stocks. Significant ARCH and GARCH terms in conditional variance equation indicate presence of ARCH and GARCH effect in return series and is captured. The

persistence of shocks of the most of them are close to 1 which means that of ARCH and GARCH effects exists and takes long time for decay.

3. Bahrain

The empirical results s of Bahrain with other countries in table 5.7 indicates that there is significant positive mean spillover from Bahrain Islamic stock market to Indonesia, Kuwait, Turkey, US, Qatar and Dubai . However, our result doesnot supports mean spillover effect for other countries. The significant AR terms mean the current return of markets are only dependent upon lag values of return series. In conditional variance, there is positive spillover effect for China, India, Japan, Malaysia, Qatar, Dubai, Taiwan and Thailand and negative variance spillover effect from Canada, Indonesia, Turkey, and UK. However Islamic stocks of other countries in the study have no significant impact on volatility of Bahrain Islamic stocks. ARCH and GARCH terms in conditional variance equations are mostly significant which indicateexistence of ARCH and GARCH effect in return series which is captured. The persistence of shocks of the most of them are close to 1 which means that of ARCH and GARCH effects exists and takes long time for decay.

4. Canada

The analysis of Canada with other countries are present Table 5.8. It suggests that there is strong mean spillover from Canadian's Islamic stock market to other countries, including China, India, Indonesia, Japan, Malaysia, SriLanka, Turkey, UK, US, KSA, Dubai, Taiwan, Thailand and Qatar. Although, our observed result doesn't supports mean spillover effect for Kuwait, Bahrain and Pakistan. The significant AR and MA terms means the current return of markets are only dependent upon their lag values of return series and relationship between past and current random variations of return series respectively. There is positive integration at variance level for US and Taiwan Islamic stocks, and negative integration at volatility level of

Indonesian, Bahrain and Turkish Islamic stocks. However Islamic stocks of other countries in the study have no significant impact on volatility of Canadian Islamic stocks. ARCH and GARCH terms in conditional variance equations are mostly significant which indicates the existence of ARCH and GARCH effect in return series and is captured. The persistence of shocks of the most of them are close to 1 which means that of ARCH and GARCH effects exists and takes long time for decay.

Table 5.5: Empirical Results of Bivariate Analysis of Pakistan with Other Countries

		Canada	China	India	Indonesia	Japan	Kuwait	Malaysia	Sri-Lanka	Turkey	UK	US	Qatar	KSA	Dubai	Taiwan	Thailand	Bahrain
ARMA(p,q)		(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	([6],0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)
GARCH(p,q)		(2,1)	(2,1)	(2,1)	(2,1)	(2,1)	(1,1)	(2,1)	(2,1)	(2,1)	(2,1)	(2,1)	(2,1)	(2,1)	(2,1)	(2,1)	(2,1)	(2,1)
Parameter		Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)
Mean eq	$\hat{a}_0$	0.0012** (0.0002)	0.0012** (0.0002)	0.0011** (0.0002)	0.0012** (0.0002)	0.0012** (0.0002)	0.0015** (0.0002)	0.0012** (0.0002)	0.0012** (0.0002)	0.0012** (0.0002)	0.0012** (0.0002)	0.0012** (0.0002)	0.0014** (0.0002)	0.0012** (0.0002)	0.0010** (0.0002)	0.0012** (0.0002)	0.0012** (0.0002)	0.0013** (0.0002)
	$\hat{a}_1$	0.0258 (0.0177)	0.1566** (0.0206)	0.1079** (0.0165)	0.0925** (0.0162)	0.0733** (0.0191)	0.1644** (0.0213)	0.1635** (0.0253)	0.0836** (0.0230)	0.0571** (0.0185)	0.0643** (0.0175)	0.0167** (0.0249)	0.0680** (0.0190)	0.0963** (0.0167)	0.1412** (0.0217)	0.0383* (0.0200)	0.1275** (0.0196)	0.0186 (0.2065)
	$\hat{a}_2$	0.0976** (0.0290)	0.0942** (0.0258)	0.1143** (0.0265)	0.1010 (0.0263)	0.0964** (0.0263)	0.1311** (0.0290)	0.0975** (0.0285)	0.0885** (0.0271)	0.0941** (0.0268)	0.1027** (0.0258)	0.0917** (0.0266)	-0.0532* (0.0286)	0.1084** (0.0298)	0.1319** (0.0346)	0.0935** (0.0281)	0.1046** (0.0288)	0.0923** (0.0306)
Variance eq	$\hat{\theta}_0$	6.62E-06** (1.05E-06)	8.30E-06** (1.17E-06)	4.82E-06** (2.15E-06)	7.75E-06** (1.01E-06)	1.01E-05** (1.17E-06)	4.95E-05** (5.06E-06)	4.23E-06** (1.08E-06)	8.73E-06** (1.01E-06)	8.79E-06** (1.47E-06)	8.75E-06** (1.14E-06)	8.38E-06 (1.25E-06)	6.58E-06** (8.06E-07)	7.00E-06** (8.69E-07)	2.14E-05** (1.84E-06)	2.72E-06 (2.10E-06)	4.59E-06** (1.22E-06)	7.54E-06** (9.73E-07)
	$\hat{\theta}_1$	0.1910** (0.0120)	0.1864** (0.0122)	0.1839** (0.01170)	0.1837** (0.0115)	0.1991** (0.0130)	0.3432 (0.0326)	0.1725** (0.0110)	0.2031** (0.0127)	0.1969** (0.0126)	0.1937** (0.0123)	0.1966** (0.0126)	0.1869** (0.0131)	0.1917** (0.0137)	0.2281** (0.0215)	0.1982 (0.0125)	0.1786** (0.0119)	0.2012** (0.0123)
	$\hat{\theta}_2$	0.1889** (0.0364)	0.1887** (0.0353)	0.1956** (0.0367)	0.1924 (0.0347)	0.2061** (0.0376)	0.3272 (0.0572)	0.1667** (0.0342)	0.2203** (0.0386)	0.2045** (0.0365)	0.1931** (0.0361)	0.1989** (0.0369)	0.1510** (0.0336)	0.1191** (0.0311)	0.7471** (0.0433)	0.1675** (0.0337)	0.1575** (0.0328)	0.1993** (0.0363)
	$\hat{\theta}_3$	0.0188** (0.0055)	0.0063** (0.0097)	0.0360** (0.0151)	0.0092* (0.0048)	-0.0164** (0.0067)		0.0827** (0.0169)	-0.0021** (0.0060)	0.0022** (0.0099)	0.0036** (0.0059)	0.0134** (0.0129)	0.0334** (0.0047)	0.0357** (0.0045)	0.0594** (0.0081)	0.0805** (0.0232)	0.0470** (0.0108)	0.5167** (0.0344)
	$\hat{\theta}_4$	0.5376** (0.0350)	0.5499** (0.0354)	0.5307** (0.0354)	0.5465** (0.0354)	0.5348** (0.0367)	-0.0953** (0.0051)	0.5710** (0.0333)	0.5127** (0.0375)	0.5272** (0.0357)	0.5384** (0.0353)	0.5289** (0.0359)	0.5731** (0.0328)	0.5920** (0.0300)	-0.2078** (0.0160)	0.5478** (0.0327)	0.5697 (0.0326)	0.0120** (0.0029)

* Denotes significance at the 10% level.
** Denotes significance at the 5% level.

Table 5.6: Empirical Results of Bivariate Analysis of Malaysia with Other Countries

		Canada	China	India	Indonesia	Japan	Kuwait	Pakistan	Sri-Lanka	Turkey	UK	US	Qatar	KSA	Dubai	Taiwan	Thailand	Bahrain
ARMA(p,q)		(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	([2],0)	(1,0)	(1,0)
GARCH(p,q)		(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(0,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)
Parameter		Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)
Mean eq	$\hat{a}_0$	7.03E-05 (0.0002)	4.35E-05 (0.0002)	8.69E-05 (0.0002)	1.03E-05 (0.0002)	3.03E-05 (0.0002)	0.00015 (0.0002)	3.11E-05 (0.0002)	9.75E-05 (0.0002)	8.42E-05 (0.0002)	9.67E05 (0.0002)	1.85E-06 (0.0002)	6.21E-05 (0.0002)	2.49E-05 (0.0002)	2.47E-05 (0.0002)	2.87E-05 (0.0002)	1.57E-05 (0.0002)	0.0001 (0.0002)
	$\hat{a}_1$	0.1365** (0.0147)	0.4581** (0.0153)	0.2551** (0.0126)	0.2956** (0.0127)	0.2106** (0.0159)	0.1761** (0.0258)	0.0691** (0.0171)	0.0509** (0.0186)	0.1901** (0.0143)	0.1966** (0.0150)	0.1849** (0.0205)	0.0487** (0.0189)	0.1672** (0.0171)	0.1772** (0.0154)	0.1855** (0.0171)	0.2933** (0.0160)	0.0133** (0.0132)
	$\hat{a}_2$	0.1170** (0.0273)	0.0627** (0.0224)	0.0839** (0.0253)	0.1077** (0.0232)	0.1040** (0.0253)	0.1008** (0.0282)	0.0990** (0.0280)	0.1034** (0.0298)	0.1022** (0.0270)	0.1065** (0.0265)	0.1120** (0.0276)	0.1085** (0.0286)	0.0939** (0.0277)	0.0866** (0.0274)	0.0524** (0.0264)	0.0883** (0.0253)	0.1088** (0.0289)
Variance eq	$\hat{\theta}_0$	2.13E-06** (6.70E-07)	1.12E-06** (3.60E-07)	2.05E-06** (4.39E-07)	1.78E-06** (4.02E-07)	2.25E-06** (4.71E-07)	2.72E-06** (6.09E-07)	2.36E-06** (5.12E-07)	2.94E-06** (7.47E-07)	2.94E-06** (5.91E-07)	2.39E-06** (5.55E-07)	2.50E-06** (5.88E-07)	2.75E-06** (5.58E-07)	2.42E-06** (5.79E-07)	2.84E-06** (6.30E-07)	-6.93E-07 (8.97E-07)	1.85E-06** (5.15E-07)	2.36E-06** (5.35E-07)
	$\hat{\theta}_1$	0.0689** (0.0124)	0.0447** (0.0085)	0.0661** (0.0091)	0.0535** (0.0095)	0.0588** (0.0086)	0.0710** (0.0109)	0.0647** (0.0095)	0.0879** (0.0126)	0.0763** (0.0108)	0.0641** (0.0103)	0.0704** (0.0113)	0.0721** (0.0164)	0.0613** (0.0112)	0.0638** (0.0106)	0.0610** (0.0106)	0.0513** (0.0071)	0.0717** (0.0105)
	$\hat{\theta}_2$	0.8521** (0.0265)	0.9260** (0.0137)	0.9143** (0.0117)	0.9137** (0.0158)	0.9076** (0.0144)	0.8903** (0.0168)	0.9011** (0.0152)	0.8520** (0.0199)	0.8822** (0.0170)	0.8920** (0.0184)	0.8762** (0.0213)	0.8858** (0.0164)	0.8829** (0.0199)	0.8925** (0.0186)	0.8745** (0.0215)	0.8891** (0.0193)	0.8877** (0.0169)
	$\hat{\theta}_3$	0.0171** (0.0037)	0.0029* (0.0016)	-0.0050** (0.0023)	0.0001 (0.9300)	-0.0007 (0.0029)	-0.0012 (0.0071)	0.0003 (0.0012)	0.01362** (0.0049)	-0.0017 (0.0036)	0.0024 (0.0022)	0.0125** (0.0064)	0.0019 (0.0019)	0.0105** (0.0029)	4.18E-05 (0.0016)	0.0505** (0.0136)	0.0118** (0.0044)	0.0022** (0.0011)

* Denotes significance at the 10% level.
** Denotes significance at the 5% level.

Table 5.7: Empirical Results of Bivariate Analysis of Bahrain with Other Countries

Countries		Canada	China	India	Indonesia	Japan	Kuwait	Malaysia	Pakistan	Sri-Lanka	Turkey	UK	US	Qatar	KSA	Dubai	Taiwan	Thailand
ARMA(p,q)		([4],0)	([4],0)	([4],0)	([4],0)	([4],0)	([4],0)	([4],0)	([4],0)	([4],0)	([4],0)	([4],0)	(1,0)	([4],0)	([4],0)	([4],0)	([4],0)	([4],0)
GARCH(p,q)		(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(0,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)
Parameter		Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)
Mean eq	$\hat{a}_0$	-0.0008** (0.0003)	-0.0008** (0.0003)	-0.0008** (0.0003)	-0.0008** (0.0003)	-0.0009** (0.0003)	-0.0008** (0.0003)	-0.0009** (0.0003)	-0.0008** (0.0003)	-0.0008** (0.0003)	-0.0008 (0.0005)	-0.0008** (0.0003)	-0.0003 (0.0003)	-0.0009** (0.0003)	-0.0007** (0.0003)	-0.0009** (0.0003)	-0.0008** (0.0002)	-0.0008** (0.0002)
	$\hat{a}_1$	0.0071 (0.0175)	0.0169 (0.0268)	0.0048 (0.0198)	0.0570** (0.0214)	0.0288 (0.0265)	0.0852** (0.0334)	0.0218 (0.0313)	-0.0165 (0.0206)	0.0368 (0.0278)	0.0803** (0.0286)	-0.0162 (0.0175)	0.0974** (0.0317)	0.0426** (0.0279)	-0.0262 (0.0296)	0.0461* (0.0271)	-0.0113 (0.0257)	-0.0238 (0.0263)
	$\hat{a}_2$	0.1277** (0.0300)	0.1248** (0.0297)	0.1252** (0.0295)	0.1287** (0.0298)	0.1252** (0.0299)	0.1257** (0.0301)	0.1209** (0.0301)	0.1272** (0.0299)	0.1253** (0.0300)	0.0913** (0.0274)	0.1274** (0.0301)	0.0822** (0.0304)	0.1237** (0.0301)	0.1280** (0.0299)	0.1260** (0.0300)	0.1247** (0.0297)	0.1238** (0.0297)
Variance eq	$\hat{\theta}_0$	1.34E-05** (1.10E-06)	9.60E-06** (1.07E-06)	6.43E-06** (1.80E-06)	1.06E-05** (1.08E-06)	1.08E-05** (1.16E-06)	1.03E-05** (9.86E-07)	6.67E-06** (1.20E-06)	1.14E-05** (9.64E-07)	1.14E-05** (9.55E-07)	0.0001** (8.45E-06)	1.63E-05** (1.30E-06)	0.0002** (4.40E-06)	1.04E-05** (9.15E-07)	1.11E-05** (9.25E-07)	1.05E-05** (9.56E-07)	7.76E-06** (1.45E-06)	8.27E-06** (1.27E-06)
	$\hat{\theta}_1$	0.2055** (0.0129)	0.1942** (0.0126)	0.1918** (0.0130)	0.1971** (0.0137)	0.1990** (0.0128)	0.2008** (0.0127)	0.1953** (0.0127)	0.2034** (0.0128)	0.1987** (0.0126)	0.0639** (0.0025)	0.2077** (0.0143)	0.1415** (0.0183)	0.2015** (0.0129)	0.1999** (0.0126)	0.1989** 0.0134 ()	0.1909** (0.0135)	0.1918** (0.0133)
	$\hat{\theta}_2$	0.7799** (0.0113)	0.7823** (0.0115)	0.7860 (0.0114)	0.7854** (0.0119)	0.7809** (0.0113)	0.7814** (0.0114)	0.7781** (0.0115)	0.7781** (0.0114)	0.7806** (0.0114)	0.5737** (0.0183)	0.7675** (0.0123)		0.7758** (0.0120)	0.7805** (0.0115)	0.7761** (0.0124)	0.7855** (0.0114)	0.7852** (0.0117)
	$\hat{\theta}_3$	-0.0145** (0.0032)	0.0167** (0.0089)	0.0292** (0.0109)	-0.0012** (0.0059)	0.0023** (0.007)	0.0095 (0.0124)	0.0754** (0.0181)	-0.0022 (0.0021)	-0.0022 (0.0038)	-0.2127** (0.0107)	-0.0233** (0.0025)	0.0309 (0.0345)	0.0114** (0.0059)	-0.0003 (0.0045)	0.0106** (0.0054)	0.0330** (0.0134)	0.0219** (0.007805)

Table 5.8: Empirical results of bivariate analysis of Canada with other countries

		China	India	Indonesia	Japan	Kuwait	Malaysia	Pakistan	Sri-Lanka	Turkey	UK	US	Qatar	KSA	Dubai	Taiwan	Thailand	Bahrain
ARMA(p,q)		(1,0)	(0,0)	(0,0)	(1,1)	(1,0)	([5],[5])	(1,0)	(1,0)	(1,0)	([6],[6])	(1,0)	(1,0)	([6],[6])	([4],[4])	(1,1)	([4],[4])	(1,0)
GARCH(p,q)		(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)
Parameter		Coeff. (std. err.)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)
Mean eq	$\hat{a}_0$	-0.0002 (0.0002)	-0.0001 (0.0003)	-0.0001 (0.0003)	-0.0001 (0.0002)	-9.20E-05 (0.0003)	-3.63E-05 (0.0002)	-9.49E-05 (0.0003)	-9.86E-05 (0.0003)	-0.0001 (0.0003)	-0.0003 (0.0002)	-0.0005** (0.0002)	-0.0002 (0.0003)	-0.0001 (0.0002)	-0.0002 (0.0004)	-0.0002 (0.0002)	-0.0002 (0.0004)	-8.97E-05 (0.0003)
	$\hat{a}_1$	0.4452** (0.0253)	0.2273** (0.0202)	0.1437** (0.0194)	0.2558** (0.0242)	0.0458 (0.0421)	0.3098** (0.0332)	-0.0016 (0.0206)	0.0550* (0.0325)	0.2172** (0.0165)	0.6698** (0.0000)	0.8943** (0.0232)	0.1503** (0..0238)	0.2042** (0.0225)	0.0734** (0.0232)	0.2907** (0.0272)	0.2256** (0.0000)	0.0222 (0.0177)
	$\hat{a}_2$	-0.051** (0.0264)			0.2860** (0.0805)	0.0618** (0.0421)	0.2407** (0.0994)	0.0636** (0.0272)	0.0590** (0.0275)	0.0389** (0.0269)	-0.0582** (0.0297)	0.0589** (0.0201)	0.0560** (0.0266)	0.2235** (0.0950)	-0.5238** (0.1338)	0.4010** (0.0805)	-0.2978** (0.1000)	0.0620** (0.0276)
	$\hat{a}_3$				-0.2747** (0.0838)		-0.2887** (0.0994)				0.0854** (0.0399)			-0.2404** (0.0981)	0.5044** (0.1365)	-0.4209** (0.0856)	0.2901** (0.1022)	
Variance eq	$\hat{\theta}_0$	1.64E-07 (6.05E-07)	1.60E-06** (6.17E-07)	1.35E-06** (4.93E-07)	6.83E-07 (5.67E-07)	7.45E-07 (5.10E-07)	7.41E-07 (7.75E-07)	1.09E-06** (4.42E-07)	8.40E-07* (4.84E-07)	1.49E-06** (7.29E-07)	1.19E-06* (6.32E-07)	5.38E-07 (4.57E-07)	1.15E-06* (4.68E-07)	7.37E-07* (4.47E-07)	1.22E-06** (5.31E-07)	-1.04E-06 (1.08E-06)	6.92E-07 (6.36E-07)	1.32E-06** (6.48E-07)
	$\hat{\theta}_1$	0.0549** (0.0086)	0.0544** (0.0075)	0.0525** (0.0073)	0.0626** (0.0083)	0.0581** (0.0076)	0.0620** (0.0086)	0.0567** (0.0075)	0.0615** (0.0082)	0.0609** (0.0084)	0.0742** (0.0118)	0.0411** (0.0085)	0.0554** (0.0073)	0.0555** (0.0076)	0.0593** (0.0081)	0.0548** (0.0079)	0.0587** (0.0087)	0.0579** (0.0075)
	$\hat{\theta}_2$	0.9296 (0.0105)	0.9413** (0.0074)	0.9443** (0.0074)	0.9314** (0.0082)	0.9364** (0.0076)	0.9296** (0.0099)	0.9400** (0.0072)	0.931** (0.0094)	0.9333** (0.0084)	0.8898** (0.0000)	0.9370** (0.0116)	0.9405** (0.0073)	0.9363** (0.0081)	0.9364** (0.0079)	0.9284** (0.0099)	0.9320** (0.0087)	0.9372** (0.0076)
	$\hat{\theta}_3$	0.0241 (0.0120)	-0.0047 (0.0031)	-0.0039* (0.0021)	0.0044 (0.00632)	0.0089 (0.0113)	0.0129 (0.0193)	-0.0017 (0.0012)	0.0075 (0.0064)	-0.0026** (0.0076)	0.0182 (0.0168)	0.0191** (0.0049)	0.0004 (0.0025)	0.0071 (0.0047)	-0.0019 (0.0023)	0.0388** (0.0179)	0.0074 (0.0056)	-0.0010 (0.0013)

* Denotes significance at the 10% level.
** Denotes significance at the 5% level.

5. China

The bivariate analysis of China with other countries the empirical results are presented in Table 5.9 There is significant mean spillover from Chinese Islamic stock market to all other countries in the study. However, our empirical result doesn't supports mean spillover effect for SriLanka. The significant AR terms mean the current return of markets are only dependent upon their lag values of return series. The significant MA terms show relationship between past and current random variations of return series. In addition there is positive variance spillover for Canada, Malaysia, UK, US and Thailand Islamic stocks, and negative volatility spillover effect of Dubai and Bahrain Islamic stocks. However Islamic stocks of other countries in the study have no significant impact on volatility of Chinses Islamic stocks. ARCH and GARCH terms in conditional variance equations are mostly significant which show presence of ARCH and GARCH effect in return series and is captured. The persistence of shocks of the most of them are closer to 1 which means that of ARCH and GARCH effects exists and takes long time for remove.

6. India

Table 5.10 shows integration of India with other countries at return and volatility level. Results show that Indian Islamic stock returns are integrated at mean level with all other countries. However, our result does not supports for Qatar and Bahrain Islamic stocks. The significant AR terms mean the current return of markets are only dependent upon their lag values of return series. The positive integration at variation level for China, Canada, Indonesia, SriLanka, US, Taiwan and Thailand and negative with Qatar Islamic stocks. However Islamic stocks of other countries in the study have no significant impact on volatility of Indian Islamic stocks. ARCH and GARCH terms in conditional variance equations are mostly significant which show existence of ARCH and GARCH effect in return series which is captured.

Table 5.9: Empirical Results of Bivariate Analysis of China with Other Countries

		Canada	India	Indonesia	Japan	Kuwait	Malaysia	Pakistan	Sri-Lanka	Turkey	UK	US	Qatar	KSA	Dubai	Taiwan	Thailand	Bahrain
ARMA(p,q)		(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	([3],[2])	(1,0)	(1,0)	(1,0)	(1,0)
GARCH(p,q)		(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(0,2)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)
Parameter		Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)
Mean eq	$\hat{\alpha}_0$	0.0003 (0.0002)	0.0002 (0.0002)	0.0001 (0.0002)	0.0001 (0.0002)	0.0003 (0.0002)	0.0002 (0.0002)	0.0002 (0.0002)	0.0003 (0.0002)	0.0003 (0.0002)	0.0002 (0.0002)	-4.87E-05 (0.0002)	0.0002 (0.0002)	0.0003 (0.0002)	0.0002 (0.0002)	0.0002 (0.0002)	-8.97E-05 (0.0003)	0.0003 (0.0002)
	$\hat{\alpha}_1$	0.2364** (0.0160)	0.3075** (0.0150)	0.3322** (0.0144)	0.3137** (0.0163)	0.2020** (0.0273)	0.6118** (0.0208)	0.0755** (0.0162)	0.0316 (0.0214)	0.1986 (0.0185)	0.3327** (0.0159)	0.4231** (0.0247)	0.0596** (0.0206)	0.1851** (0.0182)	0.1613** (0.0147)	0.4755** (0.0177)	0.0222** (0.0177)	0.0325** (0.0137)
	$\hat{\alpha}_2$	0.1223** (0.0264)	0.0657** (0.0263)	0.0885** (0.0255)	0.1079** (0.0244)	0.1111** (0.0290)	0.0752** (0.0249)	0.1127** (0.0291)	0.1193** (0.0293)	0.1162** (0.0285)	0.1097** (0.0248)	0.1004** (0.0278)	0.1227** (0.0293)	-0.0708** (0.0250)	0.0924** (0.0289)	0.0719** (0.0252)	0.0620** (0.0276)	0.1182** (0.0289)
	$\hat{\alpha}_3$													0.0641** (0.0277)				
Variance eq	$\hat{\theta}_0$	1.46E-06** (5.09E-07)	1.71E-06** (4.83E-07)	1.67E-06** (4.55E-07)	1.53E-06** (4.87E-07)	1.48E-06** (4.86E-07)	1.12E-06* (6.45E-07)	1.33E-06** (4.55E-07)	1.44E-06 (4.42E-07)	9.26E-07 (5.67E-07)	1.37E-06** (4.66E-07)	1.45E-05** (4.45E-06)	1.51E-06** (4.28E-07)	1.32E-06** (4.36E-07)	1.76E-06** (5.07E-07)	4.41E-07 (7.11E-07)	1.32E-06** (6.48E-07)	1.86E-06** (5.22E-07)
	$\hat{\theta}_1$	0.0565** (0.0091)	0.0508** (0.0078)	0.0524** (0.0080)	0.0489** (0.0079)	0.0581** (0.0082)	0.0460** (0.0108)	0.0531** (0.0076)	0.0546** (0.0074)	0.0563** (0.0083)	0.0573** (0.0089)	0.0211 (0.0186)	0.0545** (0.0074)	0.0516** (0.0077)	0.0527** (0.0081)	0.0761** (0.0111)	0.0579** (0.0075)	0.0544** (0.0075)
	$\hat{\theta}_2$	0.9136** (0.0169)	0.9362** (0.0105)	0.9270** (0.0122)	0.9315** (0.0120)	0.9266** (0.0107)	0.8934** (0.0245)	0.9321 (0.0102)	0.9312** (0.00978)	0.9245** (0.0116)	0.9136** (0.0153)		0.9313** (0.0094)	0.9339** (0.0102)	0.9310** (0.0113)	0.9080** (0.0134)	0.9372** (0.0076)	0.9305** (0.0100)
	$\hat{\theta}_3$											0.0291** (0.0120)						
	$\hat{\theta}_4$	0.0061* (0.0037)	-0.0043 (0.0027)	-0.0007 (0.0020)	0.0005 (0.0031)	-0.0008 (0.0054)	0.0422** (0.0148)	0.0007 (0.0010)	-0.0005 (0.0031)	0.0061 (0.0039)	0.0059* (0.0036)	0.7512** (0.0736)	-0.0010 (0.0009)	0.0002 (0.0014)	-0.0021** (0.0009)	0.00894 (0.0095)	-0.0010 (0.0013)	-0.0016** (0.0008)

* Denotes significance at the 10% level.
** Denotes significance at the 5% level.

Table 5.10: Empirical Results of Bivariate Analysis of India with Other Countries

		Canada	China	Indonesia	Japan	Kuwait	Malaysia	Pakistan	Sri-Lanka	Turkey	UK	US	Qatar	KSA	Dubai	Taiwan	Thailand	Bahrain
ARMA(p,q)		(1,0)	([5],0)	(1,1)	([5],0)	(1,0)	(1,0)	(1,0)	([6],1)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)
GARCH(p,q)		(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)
Parameter		Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)
Mean eq	a_0	0.00012 (0.0003)	4.22E-05** (0.0003)	-7.68E-05 (0.0002)	8.11E-05 (0.0003)	0.00014 (0.0003)	0.00016 (0.0003)	-4.33E-05 (0.0003)	0.00013** (0.0003)	5.06E-05 (0.0003)	7.10E-05 (0.0003)	-0.0001 (0.0003)	6.57E-05 (0.0003)	7.46E-05 (0.0003)	1.98E-05 (0.0003)	1.20E-05 (0.0003)	-1.96E-06 (0.0003)	0.0001 (0.0003)
	a_1	0.2658** (0.0196)	0.5713** (0.0220)	0.3811** (0.0190)	0.1987** (0.0240)	0.1761** (0.0383)	0.5987** (0.0266)	0.1376** (0.0249)	0.0696** (0.0314)	0.2733** (0.0230)	0.3750** (0.0186)	0.4050** (0.0258)	0.0334 (0.0243)	0.2294** (0.0204)	0.2335** (0.0216)	0.3450** (0.0250)	0.4519** (0.0205)	0.0109 (0.0181)
	a_2	0.0901** (0.0264)	0.0443 (0.0222)	0.1695** (0.0576)	0.0460* (0.0246)	0.0877** (0.0278)	0.0441* (0.0251)	0.0784** (0.0279)	-0.0693** (0.0270)	0.0778** (0.0270)	0.0836** (0.0247)	0.0951** (0.0261)	0.0931** (0.0282)	0.0829** (0.0269)	0.0728** (0.0276)	0.0574** (0.0268)	0.04434 (0.0520)	0.0926** (0.0281)
	a_3			-0.1410** (0.0639)					0.0949** (0.0287)									
Variance eq	θ_0	7.60E-06** (2.12E-06)	4.33E-06** (1.53E-06)	7.05E-06** (2.26E-06)	6.65E-06** (1.66E-06)	6.56E-06** (1.80E-06)	4.07E-06** (1.55E-06)	6.37E-06** (1.67E-06)	6.52E-06** (1.75E-06)	5.22E-06** (1.97E-06)	6.96E-06** (1.74E-06)	6.59E-06** (1.84E-06)	6.97E-06 ** (1.80E-06)	4.80E-06** (1.51E-06)	5.66E-06** (1.54E-06)	2.10E-06 (1.67E-06)	4.07E-06** (1.66E-06)	7.04E-06** (1.83E-06)
	θ_1	0.0696** (0.0130)	0.0681** (0.0132)	0.0590** (0.0131)	0.0723** (0.0113)	0.0722** (0.0122)	0.0625** (0.0119)	0.0687** (0.0114)	0.0676** (0.0112)	0.0617** (0.0119)	0.0717** (0.0118)	0.0805** (0.0142)	0.0748** (0.0118)	0.0653** (0.0110)	0.0693** (0.0121)	0.0698** (0.0121)	0.0569** (0.0126)	0.0740** (0.0114)
	θ_2	0.8585** (0.0257)	0.8792** (0.0236)	0.8553** (0.0302)	0.8887** (0.0168)	0.8848** (0.0189)	0.8960** (0.0192)	0.8892** (0.0178)	0.86912** (0.0214)	0.8920** (0.0207)	0.8702 (0.0211)	0.8561** (0.0207)	0.8777** (0.0184)	0.9014** (0.0169)	0.8933** (0.0179)	0.8809** (0.0210)	0.8738** (0.0263)	0.8802** (0.0180)
	θ_3	0.0142** (0.0072)	0.0217** (0.0109)	0.0239** (0.0084)	-0.0042 (0.0077)	0.0052 (0.0101)	0.0190 (0.0126)	0.0016 (0.0032)	0.0332** (0.0140)	0.0117 (0.0126)	0.0049 (0.0056)	0.0288** (0.0140)	-0.0056** (0.0034)	0.0025 (0.0029)	0.0003 (0.0025)	0.0521** (0.0227)	0.0377** (0.0126)	0.0003 (0.0029)

* Denotes significance at the 10% level.
** Denotes significance at the 5% level.

7. Indonesia

The empirical analysis of Indonesia with other countries show that there significant mean spillover from Indonesian Islamic stock market to all other countries in the study. However, our empirical result doesn't supports mean spillover effect for SriLanka Thailand and Bahrain. The significant AR terms mean the current return of markets are only dependent upon their lag values of return series. There is positive variance spillover for Canada, Malaysia, SriLanka, US, and Taiwan, Bahrain and Thailand and negative volatility spillover effect of Dubai Islamic stocks. However Islamic stocks of other countries in the study have no significant impact on volatility of Indonesian Islamic stocks. ARCH and GARCH terms in conditional variance equations are mostly significant which show ARCH and GARCH effect in return series which is captured. The persistence of shocks of the most of them are close to 1 which means that of ARCH and GARCH effects exists and takes long time for decay results are presented in Table 5.11.

8. Japan

The above Table 5.12 show Japanese Islamic stock have significant mean spillover effect to all other countries in the study. However, our empirical result does not supports mean spillover effect for Pakistan and SriLanka. The significant AR terms mean the current return of markets are only dependent upon their lag values of return series. It has positive variance spillover effect for Canada, China, Kuwait, UK, US, KSA, Dubai and Taiwan. However Islamic stocks of other countries in the study have no significant impact on volatility of Japanese Islamic stocks. ARCH and GARCH terms in conditional variance equations are mostly significant which shows presence of ARCH and GARCH effect in return series and is captured. The persistence of shocks of the most of them are closer to 1 which means that of ARCH and GARCH effects exists and takes long time for decay.

Table 5.11: Empirical Results of Bivariate Analysis of Indonesia with Other Countries

		Canada	China	India	Japan	Kuwait	Malaysia	Pakistan	Sri-Lanka	Turkey	UK	US	Qatar	KSA	Dubai	Taiwan	Thailand	Bahrain
ARMA(p,q)		([2],0)	([2],0)	([2],0)	([2],0)	([2],0)	([2],0)	([2],0)	([2],0)	([2],0)	([2],0)	([2],0)	([3],0)	([2],0)	([2],0)	([2],0)	([2],0)	([2],0)
GARCH(p,q)		(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)
Parameter		Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)
Mean eq	$\hat{a}_0$	0.00042 (0.0003)	0.0003 (0.0003)	0.0003 (0.0003)	0.0002 (0.0003)	0.00040 (0.0003)	0.00036 (0.0003)	0.0002 (0.0003)	0.0003 (0.0003)	0.0002 (0.0003)	0.0003 (0.0003)	0.0003 (0.0003)	0.0001 (0.0003)	0.0003 (0.0003)	0.0004 (0.0003)	0.0002 (0.0003)	0.0002 (0.0003)	0.0003 (0.0003)
	$\hat{a}_1$	0.1588** (0.0187)	0.5848** (0.0226)	0.3576** (0.0204)	0.2631** (0.0227)	0.1578** (0.0356)	0.6628** (0.02773)	0.1021** (0.0179)	0.0379 (0.0286)	0.236** (0.0230)	0.2186** (0.0192)	0.2081** (0.0304)	0.0902** (0.0139)	0.1494** (0.0236)	0.21390** (0.0189)	0.2768** (0.0268)	0.4162** (0.0204)	0.0257 (0.0192)
	$\hat{a}_2$	-0.0620** (0.0263)	-0.0703** (0.0239)	-0.0721** (0.0237)	-0.0629** (0.0251)	-0.0664** (0.0106)	-0.0791** (0.0247)	-0.0668** (0.0259)	-0.0671** (0.0266)	-0.0605** (0.0266)	-0.0512** (0.0261)	-0.0627** (0.0271)	-0.0978** (0.0276)	-0.0624** (0.0258)	-0.0931** (0.0225)	-0.0645** (0.0273)	-0.0612** (0.0248)	-0.0640** (0.0265)
Variance eq	$\hat{\theta}_0$	4.45E-06** (1.10E-06)	4.14E-06** (1.21E-06)	3.85E-06** (1.19E-06)	6.96E-06** (1.90E-06)	4.71E-06** (1.17E-06)	3.18E-06** (1.26E-06)	4.04E-06** (1.11E-06)	4.69E-06** (1.31E-06)	5.66E-07 (1.84E-06)	3.11E-06** (8.37E-07)	3.72E-06** (1.11E-06)	3.88E-06** (8.95E-07)	4.43E-06** (1.06E-06)	8.39E-05** (5.85E-06)	-1.84E-06 (1.60E-06)	3.72E-06** (1.46E-06)	5.05E-06** (1.41E-06)
	$\hat{\theta}_1$	0.0965** (0.0139)	0.1109** (0.0139)	0.0796** (0.0099)	0.1348** (0.0174)	0.0977** (0.0145)	0.0936** (0.0145)	0.0941** (0.0144)	0.1040** (0.0155)	0.0930** (0.0144)	0.0860** (0.0116)	0.1045** (0.0151)	0.0847 (0.0123)	0.0968** (0.0142)	0.1630** (0.0051)	0.0976** (0.0147)	0.0872** (0.0140)	0.1119** (0.0167)
	$\hat{\theta}_2$	0.8787** (0.0158)	0.8312** (0.0220)	0.8996** (0.0108)	0.8160** (0.0237)	0.8790** (0.0162)	0.8504** (0.0246)	0.8801** (0.0172)	0.8681** (0.0181)	0.8554** (0.0201)	0.8907** (0.0125)	0.8593** (0.0188)	0.8961** (0.0129)	0.8814** (0.0156)	0.3845** (0.0335)	0.8538** (0.0203)	0.8618** (0.0224)	0.8553** (0.0195)
	$\hat{\theta}_4$	-0.0001 (0.0047)	0.0353** (0.0131)	-0.0045 (0.0089)	0.0125 (0.0124)	-0.0057 (0.0091)	0.0610** (0.0207)	0.0052 (0.0035)	0.0056** (0.0201)	0.06031 (0.0061)	0.00547 (0.0043)	0.0311** (0.0137)	-0.0025 (0.0019)	-0.0021 (0.0025)	-0.0597** (0.0032)	0.0979** (0.0262)	0.0277* (0.0147)	0.0048* (0.0029)

* Denotes significance at the 10% level.
** Denotes significance at the 5% level.

Table 5.12: Empirical Results of Bivariate Analysis of Japan with Other Countries

countries		Canada	China	India	Indonesia	Kuwait	Malaysia	Pakistan	Sri-Lanka	Turkey	UK	US	Qatar	KSA	Dubai	Taiwan	Thailand	Bahrain
ARMA(p,q)		([6],0)	(1,0)	([6],0)	([6],0)	(1,0)	(1,0)	([6],0)	([6],0)	([6],0)	([6],0)	([6],0)	([6],0)	(1,0)	(1,0)	([6],0)	([6],0)	([6],0)
GARCH(p,q)		(2,1)	(1,1)	(1,1)	(2,1)	(1,1)	(1,1)	(2,1)	(2,1)	(2,1)	(2,1)	(2,1)	(2,1)	(1,1)	(1,1)	(2,1)	(2,1)	(2,1)
Parameter		Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)
Mean eq	$\hat{\alpha}_0$	0.0004** (0.0002)	0.0004** (0.0002)	0.0005** (0.0002)	0.00041* (0.0002)	0.0005** (0.0002)	0.0005** (0.0002)	0.0005* (0.0002)	0.0005** (0.0002)	0.0004* (0.0002)	0.0004* (0.0002)	0.0002 (0.0002)	0.0004* (0.0002)	0.0004** (0.0002)	0.0005** (0.0002)	0.0004* (0.0002)	0.0005** (0.0002)	0.0004** (0.0020)
	$\hat{\alpha}_1$	0.1767** (0.0187)	0.4332** (0.0198)	0.1276** (0.0183)	0.1902** (0.0175)	0.0867** (0.0362)	0.3562** (0.0248)	0.0151 (0.0203)	0.0055 (0.0228)	0.0956** (0.0222)	0.2281** (0.0158)	0.2941** (0.02524)	0.0997* (0.0181	0.1039** (0.0176)	0.1110** (0.0188)	0.1573** (0.0180)	0.1742** (0.0198)	-0.0038** (0.0171)
	$\hat{\alpha}_2$	-0.0602** (0.0253)	-0.1471** (0.0254)	-0.0663** (0.0256)	-0.0619** (0.0249)	-0.1234** (0.0265)	-0.1326** (0.0265)	-0.0651** (0.0260)	-0.0649** (0.0258)	-0.0671** (0.0259)	-0.0601** (0.0251)	-0.0564** (0.0252)	-0.0636** (0.0262)	-0.1200** (0.0266)	-0.1287** (0.0265)	-0.0631** (0.0258)	-0.0648** (0.0257)	-0.0633** (0.0260)
Variance eq	$\hat{\theta}_0$	6.26E-06** (1.50E-06)	5.64E-06** (1.42E-06)	5.37E-06** (1.43E-06)	6.71E-06** (1.66E-06)	2.91E-06** (7.82E-07)	2.58E-06* (1.46E-06)	6.65E-06** (1.47E-06)	6.59E-06** (1.45E-06)	1.86E-06* (1.13E-06)	6.95E-06** (1.66E-06)	4.70E-06** (1.73E-06)	5.08E-06** (9.36E-07)	4.20E06** (8.68E-07)	5.15E-06** (9.50E-07)	1.12E-06 (1.60E-06)	3.78E-06** (1.31E-06)	6.78E-06** (1.59E-06)
	$\hat{\theta}_1$	0.1351** (0.0204)	0.0929** (0.0122)	0.1098** (0.0127)	0.1215** (0.0197)	0.0790** (0.0108)	0.0900** (0.01266)	0.1198** (0.0190)	0.1205** (0.0192)	0.1095** (0.0181)	0.1374** (0.0205)	0.1502** (0.0202)	0.1088** (0.0124)	0.0877** (0.0118)	0.0961** (0.0113)	0.1276** (0.0187)	0.1103** (0.0184)	0.1230** (0.0196)
	$\hat{\theta}_2$	0.4941** (0.0064)	0.8001** 0.0264)	0.8376** (0.0159)	0.6326** (0.1919)	0.8613** (0.0133)	0.7805** (0.0293)	0.6150** (0.1911)	0.6111** (0.1940)	0.5820** (0.2152)	0.4909** (0.1822)	0.3756** (0.1239)	0.8473 (0.0142)	0.8535** (0.0148)	0.8511** (0.0143)	0.4813** (0.1696)	0.6246** (0.1903)	0.6209** (0.1880)
	$\hat{\theta}_3$	0.0250** (0.0089)			0.0124** (0.0068)			-0.00030 (0.0015)	-0.0002 (0.0064)	0.0405** (0.0125)	0.0357** (0.0113)	0.1184** (0.0233)				0.0915** (0.0247)	0.0400** (0.0118)	0.2022 (0.1666)
	$\hat{\theta}_4$	0.2789** (0.1814)	0.0453** (0.0086)	0.0073 (0.3961)	0.1702 (0.1655)	0.0848** (0.0149)	0.1578** (0.0304)	0.2135 (0.1701)	0.2171 (0.1729)	0.2512 (0.1926)	0.2609** (0.1552)	0.3475** (0.1038)	0.0046 (0.0027)	0.0220** (0.0043)	0.0097** (0.0027)	0.3059** (0.1479)	0.1890 (0.1657)	0.0002 (0.0025)

* Denotes significance at the 10% level.
** Denotes significance at the 5% level.

9. Kuwait

The integration of Kuwait Islamic stock returns with other countries in Table 5.13 suggests that there is significant mean spillover effect with all other countries in the study. However, our result does not supports mean spillover effect for Bahrain. The significant AR terms means the current return of markets are only dependent upon their lag values return series. In addition there is positive variance spillover effect for Canada, China, UK, US, Qatar, KSA, Dubai and Thailand and negative volatility spillover effect of Pakistan Islamic stocks. However Islamic stocks of other countries in the study have no significant impact on volatility of Kuwaiti Islamic stocks. ARCH and GARCH terms in conditional variance equations are mostly significant which indicate existence of ARCH and GARCH effect in return series and is captured. The persistence of shocks of the most of them are equivalent to 1 which means that of ARCH and GARCH effects exists and takes long time for decay.

10. SriLanka

SriLankan Islamic stock returns shows significant relationship with respect to mean with to all other countries in the study. However, our empirical result does not supports for Canada, Japan, UK, US, Qatar, Bahrain and Taiwan. The significant AR terms mean the current return of markets are only dependent upon their lag values of return series. There is positive significant relationship with respect to variance for Canada, China, India, Japan, UK, US, KSA, Taiwan, Bahrain and Thailand. However Islamic stocks of other countries in the study have no significant relationship with SriLanka Islamic stocks. ARCH and GARCH terms in conditional variance equations are highly significant which indicate presence of ARCH and GARCH effect in return series. The persistence of shocks of the most of them are close to 1 which means that of ARCH and GARCH effects exists and takes long time for decay. It can verified by Table 5.14.

Table 5.13: Empirical Results of Bivariate Analysis of Kuwait with Other Countries

		Canada	China	India	Indonesia	Japan	Malaysia	Pakistan	Sri-Lanka	Turkey	UK	US	Qatar	KSA	Dubai	Taiwan	Thailand	Bahrain
ARMA(p,q)		([3],0)	([3],0)	([3],0)	([2],0)	([3],0)	([3],0)	([2],0)	([2],0)	([3],0)	([2],0)	([2],0)	([3],0)	([3],0)	([3],0)	([3],0)	([3],0)	([2],0)
GARCH(p,q)		(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(0,1)	(1,1)	(0,1)	(1,1)	(0,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)
Parameter		Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)
Mean eq	$\hat{\alpha}_0$	-8.84E-05 (0.0002)	-0.0001 (0.0002)	-0.0001 (0.0002)	-0.0001 (0.0002)	-0.0001 (0.0002)	-0.00013 (0.0002)	-0.0001 (0.0002)	-0.00026 (0.0002)	-0.00011 (0.0002)	-0.0003 (0.0002)	-0.0001 (0.0002)	-0.0003* (0.0002)	-0.00017 (0.0002)	-0.0003* (0.0002)	-0.0001 (0.0002)	-0.0001 (0.0002)	-8.60E-05 (0.0002)
	$\hat{\alpha}_1$	0.0227** (0.0110)	0.0950** (0.0123)	0.0330** (0.0106)	0.0491** (0.0102)	0.0382** (0.0127)	0.1059** (0.0165)	0.0491** (0.0115)	0.0351** (0.0173)	0.0438** (0.0127)	0.0820** (0.0133)	0.0561** (0.01515)	0.0766** (0.0.167)	0.1110** (0.0145)	0.1785** (0.0114)	0.0570** (0.0142)	0.0400** (0.0122)	0.0082 (0.0109)
	$\hat{\alpha}_2$	0.0558** (0.0268)	0.0581** (0.0267)	0.0584** (0.0264)	0.0570** (0.0283)	0.0577** (0.0260)	0.0613** (0.0258)	0.0595** (0.0281)	0.0933** (0.0180)	0.0579** (0.0263)	0.0912** (0.0185)	0.0581** (0.0287)	0.0591** (0.0212)	0.0504** (0.0215)	0.0611** (0.0257)	0.0618** (0.0253)	0.05778** (0.0268)	0.0554** (0.0269)
Variance eq	$\hat{\theta}_0$	3.67E-06** (3.86E-07)	3.78E-06** (5.05E-07)	4.35E-06** (5.58E-07)	3.50E-06** (4.74E-07)	3.96E-06** (4.77E-07)	2.81E-06** (4.85E-07)	4.03E-06** (4.09E-07)	4.10E-05 (1.11E-06)	4.23E-06* (5.08E-07)	2.28E-05** (2.14E-06)	3.43E-06** (4.53E-07)	2.02E-05** (7.37E-07)	1.39E-05** (1.42E-06)	4.64E-06** (6.33E-07)	4.15E-06** (5.17E-07)	5.24E-07 (3.49E-07)	3.93E-06** (4.63E-07)
	$\hat{\theta}_1$	0.1347** (0.0127)	0.1376** (0.0126)	0.1289** (0.0118)	0.1322** (0.0121)	0.1332** (0.0119)	0.1319** (0.0130)	0.1287** (0.0117)	0.1216 (0.0137)	0.1287** (0.0118)	0.1296** (0.0139)	0.1341** (0.0121)	0.0998** (0.0123)	0.0836** (0.0113)	0.1169** (0.0127)	0.1321** (0.0123)	0.1139** (0.0111)	0.1343** (0.0122)
	$\hat{\theta}_2$	0.7762** (0.0198)	0.7642** (0.0203)	0.7842** (0.0189)	0.7821** (0.0184)	0.7812** (0.0189)	0.7623** (0.0204)	0.7894** (0.0179)		0.7839** (0.0186)		0.7774** (0.0186)		0.0055 (0.0796)	0.7146** (0.0288)	0.7811** (0.0196)	0.7829** (0.0202)	0.7797** (0.187)
	$\hat{\theta}_3$	0.0027* (0.0015)	0.0066* (0.0034)	-0.0021 (0.0026)	0.00278 (0.0017)	0.0004 (0.0031)	0.0272** (0.0082)	-0.0018** (0.0062)	0.0135 (0.0083)	-0.0016 (0.0019)	0.1255** (0.0139)	0.0079** (0.0040)	0.1620** (0.0009)	0.2034** (0.0241)	0.0188** (0.0040)	-0.0013 (0.0049)	0.0327** (0.0039)	0.0005 (0.0005)

* Denotes significance at the 10% level.
** Denotes significance at the 5% level.

Table 5.14: Empirical Results of Bivariate Analysis of SriLanka with Other Countries

		Canada	China	India	Indonesia	Japan	Kuwait	Malaysia	Pakistan	Turkey	UK	US	Qatar	KSA	Dubai	Taiwan	Thailand	Bahrain
ARMA(p,q)		(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(0,1)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)
GARCH(p,q)		(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)
Parameter		Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)
Mean eq	$\hat{\alpha}_0$	0.0003 (0.0002)	0.0002 (0.0002)	0.0002 (0.0002)	0.0002 (0.0002)	0.0002 (0.0002)	0.0002 (0.0002)	0.0003 (0.0002)	0.0002 (0.0002)	0.0002 (0.0002)	0.0002 (0.0002)	0.0002 (0.0002)	0.0002 (0.0002)	0.0002 (0.0002)	0.0002 (0.0002)	0.0002 (0.0002)	0.0002 (0.0002)	0.0002 (0.0002)
	$\hat{\alpha}_1$	0.0159 (0.0155)	0.0518** (0.0195)	0.0443** (0.0143	0.0471** (0.0138)	-0.0087 (0.0168)	0.0550** (0.0254)	0.0917** (0.0236)	0.0503** (0.0163)	0.0272* (0.0159)	0.0013 (0.0151)	-0.0186 (0.0221)	0.0130 (0.0157)	0.0386** (0.0159)	0.0534** (0.0162)	0.0293 (0.0196)	0.0520** (0.0152)	0.0128 (0.0165)
	$\hat{\alpha}_2$	0.1129** (0.0294)	0.1186** (0.0294)	0.1189** (0.0293)	0.1179** (0.0292)	0.1134** (0.0292)	0.1115** (0.0290)	0.1137** (0.0292)	0.1110** (0.0292)	0.1138** (0.0290)	0.1106** (0.0297)	0.1118** (0.0294)	0.1041** (0.0295)	0.1138** (0.0291)	0.1141** (0.0289)	0.1151** (0.0293)	0.1164** (0.0291)	0.1135** (0.0293)
Variance eq	$\hat{\theta}_0$	1.78E-06** (6.01E-07)	2.38E-06** (7.97E-07)	1.41E-06 (1.01E-06)	3.95E-06** (8.13E-07)	3.78E-06** (7.86E-07)	3.22E-06** (7.75E-07)	3.12E-06** (8.53E-07)	4.07E-06** (7.35E-07)	3.87E-06** (1.06E-06)	2.12E-06** (6.87E-07)	2.47E-06** (8.02E-07)	4.56E-06** (8.20E-07)	3.41E-06** (6.92E-07)	4.05E-06** (7.58E-07)	1.64E-06** (1.19E-06)	2.19E-06** (7.06E-07)	3.52E-06** (7.49E-07)
	$\hat{\theta}_1$	0.1274** (0.0148)	0.1396** (0.0152)	0.1420** (0.0152)	0.1500** (0.0151)	0.1515** (0.0151)	0.1434** (0.0138)	0.1476** (0.0153)	0.1491** (0.0147)	0.1489** (0.0149)	0.1342** (0.0151)	0.1399** (0.0146)	0.1501** (0.0151)	0.1438** (0.0140)	0.1462** (0.0145)	0.1396** (0.0148)	0.1295** (0.0140)	0.1458** (0.0145)
	$\hat{\theta}_2$	0.8078** (0.0212)	0.8114** (0.0190)	0.8053** (0.0195)	0.8158** (0.0170)	0.8103** (0.0180)	0.8194** (0.0164)	0.8139** (0.0180)	0.8136** (0.0174)	0.8136** (0.0175)	0.8056** (0.0210)	0.8162** (0.0181)	0.8124** (0.0178)	0.8160** (0.0169)	0.8201** (0.0170)	0.8183** (0.0181)	0.8292** (0.0172)	0.8199** (0.0169)
	$\hat{\theta}_3$	0.0256** (0.0052)	0.0285** (0.0080)	0.0261** (0.0081)	0.0009 (0.0028)	0.0057** (0.0040)	0.0214* (0.0115)	0.0177 (0.0103)	0.0021 (0.0022)	0.0038 (0.0068)	0.0264** (0.0065)	0.0274** (0.0082)	-0.0015 (0.0019)	0.0088** (0.0032)	-0.0004 (0.0016)	0.0301** (0.0134)	0.0169** (0.0051)	0.0022** (0.0013)

* Denotes significance at the 10% level.
** Denotes significance at the 5% level.

11. Turkey

The bivariate analysis of Turkey with other countries the empirical results from Table 5.15. There is significant mean spillover from Turkish Islamic stock market to all other countries in the study. The significant AR terms mean the current return of markets are only dependent upon their lag values of return series. The significant MA terms show relationship between past and current variations of return series. In addition there is positive variance spillover for China, Indonesia, Japan, Bahrain and Malaysia and negative volatility spillover effect of Canada and Dubai Islamic stocks However Islamic stocks of other countries in the study have no significant impact on volatility of Turkish Islamic stocks. ARCH and GARCH terms in conditional variance equations are mostly significant which indicate existence of ARCH and GARCH effect in return series and is captured. The persistence of shocks of the most of them are close to 1 which means that of ARCH and GARCH effects exists and takes long time for decay. Whose values which are not closer to 1 show presence of ARCH and GARCH effects with short time for decay.

12. United Kingdom(UK)

The table 5.16 shows significant mean spillover from UK Islamic stock market to all other countries in the study and positive volatility spillover for Canada, China, Malaysia, SriLanka, US, KSA, Taiwan and Thailand and negative volatility spillover effect of India, Kuwait, Pakistan, Bahrain and Dubai Islamic stocks. However Islamic stocks of other countries in the study have no significant impact on volatility of the UK Islamic stocks. The significant AR terms mean the current return of markets are only dependent upon their lag values of return series. The significant AR terms in conditional mean equation show the current return of markets are only dependent upon lag values. The significant MA terms show relationship between past and current variations of return series. ARCH and GARCH terms in conditional

variance equations are mostly significant which indicate existence of ARCH and GARCH effect in return series. The persistence of shocks of the most of them are close to 1 which means that of ARCH and GARCH effects exists and takes long time for decay.

13. United States(US)

Our empirical results for the US Islamic stock in Table 5.17 suggests that US Islamic stock returns have mean spillover with all other countries in the study, expect for Pakistan and SriLanka. The significant AR terms mean the current return of markets are only dependent upon their lag values of return series. And have positive variance spillover for Canada, China, Indonesia, Kuwait, Malaysia, UK, KSA, Taiwan and Thailand and negative volatility spillover effect of India, and SriLanka Islamic stocks, expect Japan ,Pakistan, Turkey ,Qatar, Dubai, Bahrain. ARCH and GARCH terms in conditional variance equations are mostly significant which indicate existence of ARCH and GARCH effect in return series. The persistence of shocks of the most of them are close to 1 which means that of ARCH and GARCH effects exists and takes long time for decay.

Table 5.15: Empirical Results of Bivariate Analysis of Turkey with Other Countries

		Canada	China	India	Indonesia	Japan	Kuwait	Malaysia	Pakistan	Sri-Lanka	UK	US	Qatar	KSA	Dubai	Taiwan	Thailand	Bahrain
ARMA(p,q)		(1,1)	([2],[2])	([5],[5])	([5],[5])	(1,1)	(0,0)	(0,0)	([3],[3])	([6],[6])	(1,1)	(1,1)	(1,1)	(1,1)	([4],0)	([2],[2])	(0,0)	(1,0)
GARCH(p,q)		(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(0,1)
Parameter		Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)
Mean eq	$\hat{\alpha}_0$	0.0003** (0.0002)	0.0003 (0.0002)	0.0006* (0.0003)	0.0005 (0.0003)	0.0001 (0.0001)	0.0005* (0.0003)	0.0004 (0.0003)	9.97E-05 (0.0001)	0.0008* (0.0004)	0.0003 (0.0002)	9.42E-05 (0.0001)	0.0001 (0.0001)	0.0003* (0.0002)	0.0003 (0.0003)	0.0003 (0.0002)	0.0003 (0.0003)	0.0003 (0.0003)
	$\hat{\alpha}_1$	0.2155** (0.0163)	0.2731** (0.0257)	0.2344** (0.0187)	0.2102** (0.0209)	0.1347** (0.0226)	0.1904** (0.0391)	0.3345** (0.0276)	0.0565** (0.0191)	0.0521** (0.0215)	0.3263** (0.0166)	0.3276** (0.0224)	0.0906** (0.0223)	0.1713** (0.0221)	0.0984** (0.0178)	0.2516** (0.0255)	0.2277** (0.0219)	0.0278* (0.0169)
	$\hat{\alpha}_2$	0.3600** (0.0680)	0.2077** (0.0936)	-0.1990** (0.0852)	-0.1612* (0.0919)	0.5852** (0.1038)			0.6817** (0.1006)	-0.6341** (0.1062)	0.2634** (0.0506)	0.4360** (0.0529)	0.6033** (0.1243)	0.2779** (0.1081)	-0.0533** (0.0238)	0.2611** (0.0945)		
	$\hat{\alpha}_3$	-0.3969** (0.0751)	-0.2362** (0.0996)	0.2161** (0.0879)	0.1839** (0.0938)	-0.6101** (0.1061)			-0.6731** (0.1018)	0.6082** (0.1114)	-0.3022** (0.0586)	-0.4821** (0.0596)	-0.6123** (0.125)	-0.2927** (0.1115)	0.0003** (0.0003)	-0.2822** (0.0962)		
Variance eq	$\hat{\theta}_0$	1.24E-05** (2.64E-06)	1.06E-05** (2.26E-06)	1.30E-05** (2.88E-06)	1.08E-05** (2.47E-06)	9.65E-06** (2.32E-06)	1.04E-05** (2.08E-06)	6.32E-06** (1.97E-06)	1.31E-05** (2.31E-06)	1.17E-05** (2.12E-06)	9.62E-06** (1.91E-06)	1.05E-05** (2.19E-06)	1.13E-05** (2.25E-06)	1.09E-05** (2.16E-06)	8.24E-05** (7.08E-06)	9.68E-06** (2.43E-06)	9.59E-06** (1.99E-06)	9.49E-05** (4.60E-06)
	$\hat{\theta}_1$	0.0933** (0.0098)	0.0966** (0.0117)	0.0957** (0.0124)	0.1008** (0.0120)	0.0917** (0.0123)	0.0997** (0.0106)	0.0717** (0.0096)	0.1085** (0.0113)	0.1069** (0.0103)	0.0794** (0.0096)	0.0890** (0.0112)	0.09858** (0.0102)	0.0921** (0.0092)	0.1333** (0.0174)	0.0956** (0.0111)	0.0824** (0.0102)	0.0832** (0.018)
	$\hat{\theta}_2$	0.8098** (0.0274)	0.7940** (0.0286)	0.7891** (0.0322)	0.7834** (0.0324)	0.8036** (0.0279)	0.8107** (0.8107)	0.8490** (0.0238)	0.7935** (0.0254)	0.8082** (0.0226)	0.8302** (0.0264)	0.8215** (0.0287)	0.8114** (0.0252)	0.8249** (0.0238)	0.2833** (0.0481)	0.8049** (0.0259)	0.8339** (0.0242)	
	$\hat{\theta}_3$	-0.0054** (0.0050)	0.0256* (0.0133)	0.0033 (0.0116)	0.0193* (0.0099)	0.0280** (0.0086)	0.0239 (0.0152)	0.0440** (0.0183)	-0.0014 (0.0032)	-0.0045 (0.0074)	0.0009 (0.0030)	-0.0017 (0.0083)	0.0024 (0.0041)	-0.0034 (0.0038)	-0.0470** (0.0047)	0.0245 (0.0189)	0.004682 (0.0090)	0.1058** (0.0189)

* Denotes significance at the 10% level.
** Denotes significance at the 5% level.

Table 5.16: Empirical Results of Bivariate Analysis of UK with Other Countries

		Canada	China	India	Indonesia	Japan	Kuwait	Malaysia	Pakistan	Sri-Lanka	Turkey	US	Qatar	KSA	Dubai	Taiwan	Thailand	Bahrain
ARMA(p,q)		(0,1)	(1,0)	(0,0)	(0,[4])	(1,1)	([6],0)	(0,[5])	(0,[4])	([4],[4])	(0,[4])	(1,0)	(1,1)	([4],0)	([2],0)	(1,0)	(1,1)	(0,[4])
GARCH(p,q)		(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)
Parameter		Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)
Mean eq	$\hat{a}_0$	0.0002 (0.0002)	3.73E-05 (0.0002)	8.68E-05 (0.0002)	0.0001 (0.0002)	-2.54E-05 (0.0001)	0.0003 (0.0003)	0.0002 (0.0002)	0.0001 (0.0002)	7.64E-05 (0.0001)	0.0001 (0.0002)	-0.0003* (0.0002)	-3.20E-05 (0.0001)	5.89E-05 (0.0002)	-0.0004 (0.0002)	5.01E-05 (0.0002)	0.0001 (0.0003)	0.0001 (0.0002)
	$\hat{a}_1$	0.5952** (0.0148)	0.5637** (0.0249)	0.2936** (0.0168)	0.1746** (0.0196)	0.2815** (0.0199)	0.2389** (0.0232)	0.3650** (0.0285)	0.0583** (0.0211)	0.0112 (0.0216)	0.3272** (0.0166)	0.8675** (0.0233)	0.1331** (0.0221)	0.2473** (0.0181)	0.1908** (0.0213)	0.3256** (0.0256)	0.2827** (0.0221)	0.0053 (0.0141)
	$\hat{a}_2$	-0.1694** (0.0279)	-0.1190** (0.0264)		-0.0461* (0.0274)	0.3795** (0.0577)	0.0720** (0.0210)	-0.0579** (0.0274)	-0.0514* (0.0277)	0.5308** (0.1929)	-0.0579** (0.0277)	0.0550** (0.0215)	0.4969** (0.0846)	-0.0511** (0.0261)	-0.0477** (0.0230)	-0.0637** (0.0288)	-0.1477* (0.0791)	-0.0526* (0.0278)
	$\hat{a}_3$					-0.4461** (0.0627)							-0.5072** (0.0895)				0.1449* (0.0835)	
Variance eq	$\hat{\theta}_0$	3.88E-06** (1.32E-06)	2.38E-06** (1.49E-06)	3.67E-06* (1.02E-06)	2.46E-06** (8.60E-07)	1.49E-06** (5.30E-07)	7.47E-05** (4.56E-06)	6.21E-07 (7.56E-07)	1.70E-06** (5.39E-07)	1.47E-06** (6.95E-07)	2.71E-06** (9.66E-07)	1.02E-05** (2.90E-06)	2.00E-06** (7.10E-07)	8.81E-07** (4.33E-07)	7.36E-05** (7.49E-06)	-4.33E-07 (1.30E-06)	2.10E-06** (9.29E-07)	1.90E-06** (7.20E-07)
	$\hat{\theta}_1$	0.0968** (0.0184)	0.1056** (0.0185)	0.0851** (0.0115)	0.0714** (0.0087)	0.0608** (0.0066)	0.2078** (0.0203)	0.0602** (0.0072)	0.0590** (0.0066)	0.0715** (0.0080)	0.0777** (0.0093)	0.1649** (0.0262)	0.0664** (0.0078)	0.0534** (0.0064)	0.2207** (0.0351)	0.0669** (0.0085)	0.0808** (0.0106)	0.0613** (0.0067)
	$\hat{\theta}_2$	0.7601** (0.0518)	0.7999** (0.0405)	0.8961** (0.0152)	0.9131** (0.0123)	0.9317** (0.0082)	0.4064** (0.0129)	0.9197** (0.0111)	0.9318** (0.0087)	0.9081** (0.0116)	0.9066** (0.0125)	0.4954** (0.0808)	0.9200** (0.0110)	0.9353** (0.0079)	0.3905** (0.0471)	0.9029** (0.0140)	0.8930** (0.0157)	0.9287** (0.0090)
	$\hat{\theta}_3$	0.0476** (0.0143)	0.0929** (0.0320)	-0.0065* (0.0035)	-0.0007 (0.0021)	-0.002055 (0.0038)	-0.1696** (0.0101)	0.0311** (0.0138)	-0.0013* (0.0007)	0.0175** (0.0066)	-0.0036 (0.0047)	0.2353** (0.0558)	0.0001 (0.0020)	0.0067** (0.0025)	-0.0520** (0.0071)	0.0472** (0.0199)	0.0125** (0.0051)	-0.0009** (0.0139)

* Denotes significance at the 10% level.
** Denotes significance at the 5% level.

Table 5.17: Empirical Results of Bivariate Analysis of US with Other Countries

		Canada	China	India	Indonesia	Japan	Kuwait	Malaysia	Pakistan	Sri-Lanka	Turkey	UK	Qatar	KSA	Dubai	Taiwan	Thailand	Bahrain
ARMA(p,q)		(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	([3],0)	([3],0)	([3],0)	(1,0)	(1,0)	([5],0)	([3],0)	([3],0)	(1,0)	(1,0)	([3],0)
GARCH(p,q)		(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(2,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)
Parameter		Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)
Mean eq	$\hat{a}_0$	0.0006** (0.0002)	0.0006** (0.0002)	0.0007** (0.0002)	0.0007** (0.0002)	0.0006** (0.0002)	0.0008** (0.0002)	0.0007** (0.0002)	0.0008** (0.0002)	0.0011** (0.0002)	0.0007** (0.0002)	0.0006** (0.0001)	0.0007** (0.0002)	0.0007** (0.0002)	0.0007** (0.0002)	0.0006** (0.0002)	0.0007** (0.0002)	0.0008** (0.0002)
	$\hat{a}_1$	0.4328** (0.0123)	0.3809** (0.0199)	0.1826** (0.0133)	0.1066** (0.0150)	0.1598** (0.0143)	0.1071** (0.0302)	0.1973** (0.0234)	-0.0085** (0.0165)	-0.0418** (0.0063)	0.1843** (0.0151)	0.4714** (0.0122)	0.0951** (0.0168)	0.1584** (0.0166)	0.0945** (0.0196)	0.2229** (0.0184)	0.1729** (0.0178)	0.0326** (0.0111)
	$\hat{a}_2$	-0.0564** (0.0199)	-0.1888** (0.0263)	-0.0918** (0.0276)	-0.0711** (0.0295)	-0.0679** (0.0269)	-0.0614** (0.0289)	-0.0522** (0.0277)	-0.0572** (0.0286)	-0.0849** (0.0262)	-0.0533** (0.0272)	-0.1240** (0.0201)	-0.0467** (0.0270)	-0.0716** (0.0277)	-0.0600** (0.0284)	-0.0771** (0.0280)	-0.0709** (0.0289)	-0.0597** (0.0289)
Variance eq	$\hat{\theta}_0$	4.23E-06** (1.12E-06)	2.23E-06** (9.94E-07)	4.75E-06** (1.10E-06)	4.52E-06** (9.39E-07)	4.00E-06** (8.67E-07)	3.67E-06** (9.73E-07)	2.80E-06** (1.09E-06)	4.99E-06** (9.42E-07)	1.97E-05** (1.31E-06)	3.41E-06** (1.11E-06)	4.45E-06** (1.01E-06)	4.77E-06** (9.25E-07)	4.44E-06** (8.91E-07)	4.85E-06** (9.15E-07)	8.89E-07 (1.87E-06)	2.84E-06** (9.27E-07)	4.74E-06** (9.60E-07)
	$\hat{\theta}_1$	0.1081** (0.0182)	0.1225** (0.0200)	0.1551** (0.0191)	0.1480** (0.0179)	0.1416** (0.0169)	0.1486** (0.0178)	0.1480** (0.0201)	0.1552** (0.0178)	0.2293** (0.0240)	0.1369** (0.0179)	0.1714** (0.0249)	0.1519** (0.0172)	0.1527** (0.0174)	0.1598* (0.0184)	0.1435** (0.0217)	0.1484** (0.0183)	0.1526** (0.0173)
	$\hat{\theta}_2$	0.7518** (0.0486)	0.7615** (0.0442)	0.7922** (0.0248)	0.7962** (0.0243)	0.8075** (0.0230)	0.7859 (0.0236)	0.7755** (0.0290)	0.7900** (0.0231)	0.7380** (0.0188)	0.8136** (0.0234)	0.6866** (0.0498)	0.7922** (0.0228)	0.7864** (0.0234)	0.7855** (0.0232)	0.7464** (0.0377)	0.7728** (0.0264)	0.7932** (0.0226)
	$\hat{\theta}_3$	0.0128** (0.0055)	0.0586** (0.0215)	-0.0028** (0.0052)	0.0013** (0.0033)	0.0026 (0.0051)	0.0410** (0.0177)	0.0484** (0.0198)	-0.0008 (0.0013)	-0.1305** (0.0066)	0.0043 (0.0064)	0.0158** (0.0074)	0.0011 (0.0028)	0.0058** (0.0040)	-6.19E-05 (0.0028)	0.0963** (0.0305)	0.0277** (0.0090)	0.0003 (0.0018)

* Denotes significance at the 10% level.
** Denotes significance at the 5% level.

14. Qatar

All countries in this study show mean spillover effect with Qatar Islamic stock returns. KSA. Bahrain and Dubai shows positive variance integration, with Qatar Islamic stock returns, Kuwait, Pakistan and Turkey have no integration. Whereas all other countries in this study have negative integration with Qatar Islamic stock returns. ARCH and GARCH terms in conditional variance equations are mostly significant which show existence of ARCH and GARCH effect in return series and is captured. The persistence of shocks of the most of them are close to 1 which means that of ARCH and GARCH effects exists and takes long time for decay. Evidence can be seen from Table 5.18.

15. Kingdom of Saudi Arabia(KSA)

When KSA Islamic stock returns compared with other countries in this study. Other county's Islamic stocks return show positive significant mean spillover effect with KSA. Our empirical result does not claim this mean spillover behavior for Pakistani Islamic stock returns. The significant AR terms mean the current return of markets are only dependent upon their lag values of return series. Indonesia, Kuwait, Bahrain and Qatar Islamic stocks returns shows positive volatility spillover effect. Canada, India, Malaysia, Pakistan, UK and Taiwan Islamic stocks returns show negative volatility spillover effect. ARCH and GARCH terms in conditional variance equations are mostly significant which indicate presence of ARCH and GARCH effect in return series and is captured. The persistence of shocks of the most of them are close to 1 which means that of ARCH and GARCH effects survives and takes long time for decay. It can be seen from Table 5.19

Table 5.17: Empirical Results of Bivariate Analysis of Qatar with Other Countries

		Canada	China	India	Indonesia	Japan	Kuwait	Malaysia	Pakistan	Sri-Lanka	Turkey	UK	US	KSA	Dubai	Taiwan	Thailand	Bahrain
ARMA(p,q)		(0,0)	(0,0)	(0,0)	(0,0)	(0,0)	(0,0)	(0,0)	(0,0)	(0,0)	(0,0)	(0,0)	(0,0)	(0,0)	(0,0)	(0,0)	(0,0)	(0,0)
GARCH(p,q)		(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(0,1)	(1,1)	(1,1)	(1,1)	(1,1)
Parameter		Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)
Mean eq	$\hat{a}_0$	0.0091** (0.0002)	0.0008** (0.0002)	0.0002** (0.0040)	0.0026** (0.0048)	0.0009** (0.0002)	0.0009** (0.0002)	0.0008** (0.0002)	0.0008* (0.0002)	0.0009** (0.0002)	0.0008** (0.0002)	0.0009** (0.0002)	0.0008** (0.0002)	0.0009** (0.0002)	0.0007** (0.0001)	0.0008** (0.0002)	0.0008** (0.002)	0.0009** (0.0002)
	$\hat{a}_1$	0.0829** (0.3168)	0.03455 (0.0125)	0.0750* (0.1645)	0.0789** (0.0112)	0.0517** (0.0136)	0.0940** (0.0297)	0.0900** (0.0185)	0.0409** (0.0151)	0.0327* (0.0167)	0.0312** (0.0128)	0.0904** (0.0120)	0.1216** (0.0148)	0.2501** (0.0160)	0.1597** (0.0178)	0.0303** (0.0140)	0.0573** (0.0145)	0.0389** (0.0118)
Variance eq	$\hat{\theta}_0$	3.37E-06** (5.04E-07)	3.50E-06** (5.33E-07)	4.60E-06** (6.63E-07)	2.99E-06** (4.60E-07)	3.82E-06** (5.16E-07)	2.77E-06** (4.89E-07)	3.16E-06** (4.97E-07)	2.68E-06** (4.01E-07)	3.11E-06** (4.78E-07)	2.93E-06** (5.03E-07)	3.19E-06** (4.81E-07)	3.22E-06** (5.56E-07)	1.67E-05** (2.06E-06)	2.18E-06** (4.30E-07)	4.24E-06** (6.89E-07)	3.18E-06** (4.87E-07)	1.51E-06** (3.49E-07)
	$\hat{\theta}_1$	0.1779** (0.0227)	0.1674** (0.0114)	0.1592** (0.0112)	0.1627** (0.0106)	0.1600** (0.0100)	0.1655** (0.0109)	0.1635** (0.01125)	0.1646** (0.0104)	0.1654** (0.0107)	0.1637** (0.0107)	0.1714** (0.0110)	0.1837** (0.0128)	0.3756** (0.0333)	0.1689** (0.0118)	0.1628** (0.0105)	0.1601** (0.0110)	0.1836** (0.0133)
	$\hat{\theta}_2$	0.8113** (0.0123)	0.8170** (0.0129)	0.8288** (0.0123)	0.5142** (0.0113)	0.8348** (0.0101)	0.8251** (0.0116)	0.8275** (0.0117)	0.8248** (0.0117)	0.8207** (0.0124)	0.8260** (0.0118)	0.8192** (0.01168)	0.8075** (0.0130)		0.7905** (0.0209)	0.8250** (0.0119)	0.8272** (0.0121)	0.8078** (0.0128)
	$\hat{\theta}_3$	-0.0036** (0.0012)	-0.0067** (0.00215)	- 0.0133** (0.0028)	-0.0039** (0.0012)	- 0.0149** (0.0029)	-0.0081 (0.0080)	- 0.0117** (0.0045)	-0.0018 (0.0014)	- 0.0037** (0.0014)	-0.0036 (0.0028)	- 0.0043** (0.0012)	-0.0067** (0.0041)	0.3997** (0.0299)	0.0273** (0.0136)	- 0.0167** (0.0049)	-0.0050** (0.0016)	0.0051** (0.0010)

* Denotes significance at the 10% level.
** Denotes significance at the 5% level.

Table 5.18: Empirical Results of Bivariate Analysis of KSA with Other Countries

		Canada	China	India	Indonesia	Japan	Kuwait	Malaysia	Pakistan	Sri-Lanka	Turkey	UK	US	Qatar	Dubai	Taiwan	Thailand	Bahrain
ARMA(p,q)		(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)
GARCH(p,q)		(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(0,1)
Parameter		Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)
Mean eq	$\hat{\alpha}_0$	0.0005** (0.0002)	0.0005** (0.0002)	0.0005** (0.0002)	0.0006** (0.0002)	0.0005** (0.0002)	0.0005** (0.0002)	0.0005** (0.0002)	0.0005** (0.0002)	0.0005** (0.0002)	0.0005** (0.0002)	1.22E-07 (1.62E-05)	0.0003* (0.0002)	7.95E-05 (0.0002)	0.0004 (0.0002)	0.0005** (0.0002)	0.0005** (0.0002)	3.33E-05 (0.0002)
	$\hat{\alpha}_1$	0.1509** (0.0105)	0.2246** (0.0179)	0.1382** (0.0118)	0.1265** (0.0155)	0.1097** (0.0212)	0.2075** (0.0369)	0.2294** (0.0225)	0.0057 (0.0118)	0.0637** (0.0248)	0.1180** (0.0146)	0.1718** (0.0084)	0.2301** (0.0151)	0.2672** (0.0222)	0.1709** (0.0185)	0.1459** (0.0166)	0.1469** (0.0134)	0.0155** (0.0167)
	$\hat{\alpha}_2$	0.1083** (0.0311)	0.0860** (0.0308)	0.1078** (0.0294)	0.0472** (0.0264)	0.1141** (0.0318)	0.1187** (0.0313)	0.1027** (0.0294)	0.1238** (0.0321)	0.1133** (0.0317)	0.1171** (0.0311)	0.1313** (0.0348)	0.1074** (0.0319)	0.1655** (0.0337)	0.0887** (0.0297)	0.1062** (0.0309)	0.1044** (0.0315)	0.2558** (0.0109)
Variance eq	$\hat{\theta}_0$	5.42E-06** (5.23E-07)	4.98E-06** (4.84E-07)	7.37E-06** (6.84E-07)	3.51E-06** (5.93E-07)	4.86E-06** (6.21E-07)	4.51E-06** (6.50E-07)	5.98E-06** (6.78E-07)	5.44E-06** (4.88E-07)	5.20E-06** (5.65E-07)	4.56E-06** (4.43E-07)	5.35E-05 (3.19E-06)	4.45E-06** (3.44E-07)	9..39E-06** 1.54E-06)	5.17E-06** (4.29E-07)	6.33E-06** (5.75E-07)	4.83E-06** (5.98E-07)	5.87E-05** 1.77E-06
	$\hat{\theta}_1$	0.1510** (0.0108)	0.1553** (0.0099)	0.1284** (0.0098)	0.1374** (0.0114)	0.1325** (0.0098)	0.1259** (0.0107)	0.1367** (0.0114)	0.1261** (0.0091)	0.1252** (0.0101)	0.1241** (0.0097)	0.3208** (0.0360)	0.1522** (0.0118)	0.2396** (0.0254)	0.1189** (0.0084)	0.1222** (0.0093)	0.1442** (0.0104)	0.4498** (0.0301)
	$\hat{\theta}_2$	0.8270** (0.0085)	0.8250** (0.0079)	0.8457** (0.0088)	0.8313** (0.0118)	0.8351** (0.0095)	0.8150** (0.0129)	0.8267** (0.0106)	0.8365** (0.0089)	0.8344** (0.0107)	0.8379** (0.0103)	0.3527** (0.0363)	0.8310** (0.0087)	0.4551** (0.0317)	0.8412** (0.0086)	0.8492** (0.0089)	0.8306** (0.0098)	
	$\hat{\theta}_3$	-0.0067** (0.0023)	-0.0088 (0.0037)	-0.0210** (0.0035)	0.0076** (0.0023)	-4.53E-05 (0.0037)	0.0562** (0.0111)	-0.0127** (0.0094)	-0.0023** (0.0026)	0.0017 (0.0023)	0.0034* (0.0021)	-0.0681** (0.0040)	-0.0072** (0.0037)	0.2496** (0.0231)	-0.0006 (0.0021)	-0.0225** (0.0056)	-0.0032 (0.0027)	0.0773** (0.0079)

* Denotes significance at the 10% level.
** Denotes significance at the 5% level.

16. Dubai

The bivariate study of Dubai with other countries the results from table 5.20 implies that there is significant integration at conditional mean level from Dubai Islamic stock market to all other countries in the study. However, our observed result does not supports mean spillover effect for Qatar. The significant AR terms mean the current return of markets are only dependent upon their lag values of return series. Furthermore there is positive variance spillover effect for Kuwait, Malaysia, Turkey, and Bahrain and negative volatility spillover effect of China, India, Indonesia, UK and Taiwan Islamic stocks. However Islamic stocks of other countries in the study have no significant impact on volatility of Dubai Islamic stocks. Qatar has no kind of relation with Dubai as it does not follow the restrictions which are imposed on GARCH. ARCH and GARCH terms in conditional variance equations are mostly significant which evidence of ARCH and GARCH effect presence in return series which is captured. The persistence of shocks of the most of them are close to 1 which shows that ARCH and GARCH effects exists and takes long time for decay.

17. Taiwan

In Table 5.21 Taiwan shows significant positive mean spillover all other countries in the study and negative mean spillover effect from Dubai. Although, our empirical result doesn't supports mean spillover effect for US and Bahrain. The significant AR terms mean the current return of markets are only dependent upon lag values of return series. Moreover there is positive variance spillover for Canada, India, Kuwait, SriLanka, UK, Qatar, KSA and Thailand. However Islamic stocks of other countries in the study have no significant impact on volatility of Taiwan Islamic stocks. US has no kind of relation with Taiwan as it does not follow the restrictions which are imposed on GARCH. ARCH and GARCH terms in conditional variance equations are mostly significant which indicating existence of ARCH and GARCH effect in

return series which is captured. The persistence of shocks of the most of them are close to 1 which means that of ARCH and GARCH effects exists and takes long time for decay.

18. Thailand

The bivariate analysis of Thailand with other countries the empirical results from table 5.22 implies that there is significant positive mean spillover from Taiwan Islamic stock market to other countries. However, our empirical result does not supports mean spillover effect for Bahrain. The significant AR terms mean the current return of markets are only dependent upon lag values. The significant MA terms show relationship between past and current variations of return series. In addition there is positive variance spillover for Indonesia, and Malaysia, and negative variance spillover effect from Dubai. However Islamic stocks of other countries in the study have no significant impact on volatility of Thailand Islamic stocks. ARCH and GARCH terms in conditional variance equations are mostly significant which indicate existence of ARCH and GARCH effect in return series which is captured. The persistence of shocks of the most of them are close to 1 which means that of ARCH and GARCH effects exists and takes long time for decay

Table 5.19: Empirical Results of Bivariate Analysis of Dubai with Other Countries

		Canada	China	India	Indonesia	Japan	Kuwait	Malaysia	Pakistan	Sri-Lanka	Turkey	UK	US	Qatar	KSA	Taiwan	Thailand	Bahrain
ARMA(p,q)		(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)		(1,0)	(1,0)	(1,0)	(1,0)
GARCH(p,q)		(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)		(1,1)	(1,1)	(1,1)	(0,1)
Parameter		Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)		Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)
Mean eq	$\hat{\alpha}_0$	0.0005** (0.0002)	0.0005** (0.0002)	0.0005** (0.0002)	0.0005** (0.0002)	0.0005** (0.0002)	0.0005** (0.0002)	0.0005** (0.0002)	0.0001 (0.0009)	0.0005** (0.0002)	0.0005** (0.0002)	0.0005** (0.0002)	0.0004** (0.0002)		0.0004** (0.0002)	0.0005** (0.0002)	0.0005** (0.0002)	0.0005** (0.0002)
	$\hat{\alpha}_1$	0.0915** (0.0118)	0.2133** (0.0154)	0.1085** (0.0114)	0.1474** (0.0129)	0.1254** (0.0179)	0.3224** (0.0222)	0.2730** (0.0209)	0.1597** (0.0554)	0.0415** (0.0198)	0.0835** (0.0137)	0.1068** (0.0127)	0.1236** (0.0150)		0.2196** (0.0151)	0.0913** (0.0152)	0.1555** (0.0121)	0.0396** (0.0128)
	$\hat{\alpha}_2$	0.0733** (0.0309)	0.0725** (0.0313)	0.0690** (0.0308)	0.0891** (0.0315)	0.0735** (0.0311)	0.0722** (0.0314)	0.0615** (0.0313)	0.0275** (0.0912)	0.0698** (0.0318)	0.0703 (0.0320)	0.0765** (0.0318)	0.0818** (0.0313)		0.0777** (0.0318)	0.0759** (0.0319)	0.0569* (0.0304)	0.0747** (0.0261)
Variance eq	$\hat{\theta}_0$	2.43E-06** (4.01E-07)	2.48E-06** (4.44E-07)	3.75E-06** (5.38E-07)	2.31E-06** (4.08E-07)	2.31E-06** (4.67E-07)	8.29E-07** (3.61E-07)	1.66E-06** (4.37E-07)	0.0001** (2.79E-05)	2.26E-06** (3.87E-07)	1.72E-06** (4.46E-07)	2.59E-06** (3.92E-07)	2.28E-06** (4.07E-07)		1.53E-06** (4.72E-07)	4.07E-06** (7.31E-07)	2.56E-06** (4.12E-07)	1.49E-06** (3.14E-07)
	$\hat{\theta}_1$	0.1219** (0.0088)	0.1290** (0.0090)	0.1106** (0.0083)	0.1176** (0.0084)	0.1201** (0.0084)	0.1027** (0.0091)	0.1170** (0.0091)	0.1500** (0.0591)	0.1123** (0.0080)	0.1165** (0.0084)	0.1169** (0.0084)	0.1199** (0.0086)		0.1185** (0.0116)	0.1214** (0.0085)	0.1236 (0.0096)	0.1170** (0.0084)
	$\hat{\theta}_2$	0.8707** (0.0089)	0.8653** (0.0090)	0.8821** (0.0085)	0.8770** (0.0085)	0.8746** (0.0082)	0.8785** (0.0095)	0.8772** (0.0087)	0.6000** (0.0824)	0.8798** (0.0083)	0.8759** (0.0085)	0.8741** (0.0087)	0.8745** (0.0089)		0.8247** (0.0136)	0.8714** (0.0086)	0.8683** (0.0094)	0.8766** (0.0083)
	$\hat{\theta}_3$	-0.0018 (0.0011)	-0.0047** (0.0019)	-0.0117** (0.0022)	-0.0028** (0.0012)	-0.0032 (0.0031)	0.0412** (0.0103)	0.0019** (0.0059)	0.0000 (0.0334)	-0.0020 (0.0014)	0.0027** (0.0028)	-0.0030** (0.0012)	-0.0042 (0.0029)		0.0443** (0.0053)	-0.0192** (0.0056)	-0.0030 (0.0024)	0.0022** (0.0007)

* Denotes significance at the 10% level.
** Denotes significance at the 5% level.

Table 5.20: Empirical Results of Bivariate Analysis of Taiwan with Other Countries

		Canada	China	India	Indonesia	Japan	Kuwait	Malaysia	Pakistan	Sri-Lanka	Turkey	UK	US	Qatar	KSA	Dubai	Thailand	Bahrain
ARMA(p,q)		(0,1)	(1,0)	([2],0)	(0,[2])	(0,[2])	([2],0)	(0,[2])	(0,[2])	(0,[2])	(0,[2])	(0,1)		(0,[4])	(0,[4])	([2],0)	(1,0)	(0,[2])
GARCH(p,q)		(0,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(0,1)		(1,1)	(1,1)	(1,1)	(1,1)	(1,1)
Parameter		Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)
Mean eq	a_0	0.0002 (0.0002)	0.0002 (0.0002)	0.0002 (0.0002)	0.0002 (0.0002)	0.0003 (0.0002)	0.0003 (0.0002)	0.0003 (0.0002)	0.0002 (0.0002)	0.0003 (0.0002)	0.0002 (0.0002)	0.0001 (0.0002)		0.0003 (0.0002)	0.0002 (0.0002)	0.0003 (0.0002)	0.0002 (0.0002)	0.0003 (0.0002)
	a_1	0.2007** (0.0173)	0.5401** (0.0184)	0.2020** (0.0172)	0.2030 (0.0180)	0.1470** (0.0181)	0.1498** (0.0331)	0.3056** (0.0267)	0.0608** (0.0198)	0.0355** (0.0232)	0.1865** (0.0217)	0.2796** (0.0194)		-0.0591** (0.0252)	0.1468** (0.0176)	0.1020** (0.0209)	0.1844** (0.0207)	0.0251 (0.0162)
	a_2	-0.0844** (0.0276)	-0.0980** (0.0225)	-0.0500** (0.0259)	-0.0592** (0.0276)	-0.0536** (0.0272)	-0.0471* (0.0272)	-0.0645** (0.0274)	-0.0503* (0.0274)	-0.0487* (0.0278)	-0.0547** (0.0271)	-0.1204** (0.0281)		-0.0520* (0.0286)	-0.0467* (0.0281)	-0.0481* (0.0270)	0.0896** (0.0217)	-0.0501* (0.0287)
Variance eq	θ_0	4.42E-05** (4.69E-06)	1.14E-06** (3.97E-07)	2.71E-06** (9.46E-07)	2.68E-06** (8.18E-07)	3.90E-06** (1.06E-06)	3.65E-06** (1.20E-06)	2.40E-06** (7.66E-07)	3.56E-06** (1.04E-06)	4.07E-06** (1.23E-06)	3.55E-06** (1.25E-06)	4.77E-05** (5.03E-06)		4.10E-06** (1.17E-06)	4.35E-06** (1.29E-06)	3.58E-06** (1.05E-06)	2.56E-06** (9.27E-07)	4.01E-06** (1.15E-06)
	θ_1	0.0545** (0.0169)	0.0532** (0.0086)	0.0416** (0.0078)	0.0429** (0.0073)	0.0509** (0.0081)	0.0530** (0.0091)	0.0447** (0.0075)	0.0475** (0.0078)	0.0493** (0.0083)	0.0447** (0.0082)	0.0741** (0.0223)		0.0515** (0.0082)	0.0487** (0.0097)	0.0444** (0.0073)	0.0448** (0.0082)	0.0489** (0.0078)
	θ_2		0.9300** (0.0110)	0.9241** (0.0176)	0.9242** (0.0149)	0.9111** (0.0171)	0.8979** (0.0191)	0.9239** (0.0149)	0.9161** (0.0164)	0.8964** (0.0204)	0.9096** (0.0202)			0.9048** (0.0185)	0.8967** (0.0224)	0.9201** (0.0160)	0.9073** (0.0188)	0.9111** (0.0172)
	θ_3	0.2412** (0.0326)	0.0020 (0.0047)	0.0027** (0.0060)	0.0019 (0.0021)	-0.0023 (0.0027)	0.0229** (0.0077)	0.0069 (0.0079)	-0.0001 (0.0014)	0.0121** (0.0060)	0.0052 (0.0043)	0.2238** (0.0389)		0.0014* (0.0015)	0.0064** (0.0032)	-0.0012 (0.0010)	0.0145** (0.0050)	-0.0005 (0.0012)

* Denotes significance at the 10% level.
** Denotes significance at the 5% level.

Table 5.21: Empirical Results of Bivariate Analysis of Thailand with Other Countries

		Canada	China	India	Indonesia	Japan	Kuwait	Malaysia	Pakistan	Sri-Lanka	Turkey	UK	US	Qatar	KSA	Dubai	Taiwan	Bahrain
ARMA(p,q)		([6],0)	([5],0)	([6],0)	([6],0)	([5],0)	([5],0)	(0,([5])	([5],0)	([5],0)	([5],0)	([5],0)	([5],0)	([5],0)	([5],0)	([5],0)	([6],0)	([5],0)
GARCH(p,q)		(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)
Parameter		Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)
Mean eq	$\hat{a}_0$	0.0007** (0.0002)	0.0004* (0.0002)	0.0004** (0.0002)	0.0004 (0.0002)	0.0006** (0.0003)	0.0007** (0.0002)	0.0005** (0.0002)	0.0005** (0.0003)	0.0007** (0.0003)	0.0004* (0.0003)	0.0006** (0.0002)	0.0005** (0.0002)	0.0006* (0.0003)	0.0006** (0.0002)	0.0005** (0.0002)	0.0005** (0.0002)	0.0007** (0.0003)
	$\hat{a}_1$	0.1907** (0.0172)	0.4678** (0.0224)	0.3284** (0.0172)	0.3360** (0.0190)	0.1605** (0.0206)	0.1863** (0.0331)	0.5076** (0.0254)	0.1245** (0.0180)	0.1108** (0.0233)	0.2160** (0.0204)	0.2355** (0.0173)	0.2501** (0.0241)	0.0690** (0.0223)	0.1853** (0.0211)	0.2117** (0.0212)	0.2221** (0.0222)	-0.0193 (0.0176)
	$\hat{a}_2$	-0.0598** (0.0269)	-0.0602** (0.0234)	-0.0576** (0.0252)	-0.0539** (0.0246)	-0.0548** (0.0268)	-0.0593** (0.0271)	-0.0683** (0.0271)	-0.0617** (0.0271)	-0.0585** (0.0272)	-0.0480* (0.0275)	-0.0443* (0.0261)	-0.0515* (0.0267)	-0.0617** (0.0272)	-0.0600** (0.0263)	-0.0569** (0.0265)	-0.0606** (0.0274)	-0.0588** (0.0281)
Variance eq	$\hat{\beta}_0$	4.54E-06** (1.21E-06)	3.95E-06** (1.06E-06)	4.19E-06** (1.37E-06)	7.00E-06** (2.52E-06)	4.78E-06** (1.14E-06)	4.47E-06** (1.08E-06)	2.81E-06** (1.09E-06)	4.26E-06** (1.10E-06)	4.51E-06** (1.11E-06)	-7.38E-08 (1.24E-06)	5.27E-06** (1.23E-06)	4.54E-06** (1.16E-06)	4.74E-06** (1.13E-06)	4.72E-06** (1.11E-06)	5.00E-06** (1.15E-06)	4.04E-06** (1.52E-06)	4.05E-06** (1.09E-06)
	$\hat{\theta}_1$	0.0952** (0.0121)	0.0857** (0.0118)	0.0868** (0.0119)	0.0832** (0.0157)	0.0928** (0.0111)	0.0911** (0.0111)	0.0867** (0.0135)	0.0949** (0.0118)	0.0980** (0.0117)	0.0844** (0.0120)	0.0967** (0.0116)	0.0945** (0.0116)	0.0937** (0.0110)	0.0867** (0.0106)	0.0853** (0.0111)	0.1002** (0.0127)	0.0952** (0.0111)
	$\hat{\theta}_2$	0.8610** (0.0187)	0.8736** (0.0186)	0.8572** (0.0235)	0.7642** (0.0485)	0.8737** (0.0161)	0.8807** (0.0153)	0.8661** (0.0200)	0.8743** (0.0162)	0.8743** (0.0157)	0.8505** (0.0207)	0.8628** (0.0183)	0.8688** (0.0174)	0.8737** (0.0159)	0.8804** (0.0154)	0.8809** (0.0161)	0.8572** (0.0195)	0.8719** (0.0165)
	$\hat{\theta}_3$	0.0052 (0.0040)	0.0033 (0.0060)	0.0110 (0.0087)	0.0522** (0.0135)	-0.0029 (0.0046)	-0.0138 (0.0114)	0.0318** (0.0152)	-0.0008 (0.0020)	-0.0061 (0.0048)	0.0612** (0.0118)	-0.0020 (0.0038)	0.0019 (0.0077)	-0.0028 (0.0034)	-0.0041 (0.0033)	-0.0063** (0.0022)	0.0142 (0.0148)	0.0020 (0.0018)

* Denotes significance at the 10% level.
** Denotes significance at the 5% level.

5.3.2 Asymmetric impact of positive and negative shocks on volatility in Islamic stock markets.

1. Canada

Focusing on the asymmetric impact of shocks on volatility for Canada with other countries in Table 5.23. The results imply that there is significant mean spillover from Canadian's Islamic stock market to other countries including China, India, Indonesia, Japan, Malaysia, SriLanka, Turkey, UK, US, KSA, Dubai, Taiwan, and Thailand and Qatar. Our empirical results do not supports mean spillover effect for following countries Kuwait, Bahrain and Pakistan. The leverage effects[10] $\hat{\gamma}_2$ are negative at 5% significant level which means that good news generate less volatility than bad news. It implies that negative shocks have a greater influence on volatility relative to the positive shocks of the same magnitude and indicates that if the risk of a business goes up the investor will shift their funds to less risky investment. In addition, there is positive variance spillover for China, Japan, Kuwait, and Taiwan Islamic stocks, while negative volatility spillover effect of Pakistan Islamic stocks. However, Islamic stocks of other countries in the study show no significant impact on volatility of Canadian Islamic stocks returns. After amply EGARCH for identifying asymmetric impact of Canadian Islamic stock, Islamic stocks returns of China, Indonesia, Japan Kuwait, Pakistan, Turkey, and US, have showed change in the behavior at integration (variance level).

2. China

The empirical results of the analysis for the asymmetric effect of shocks for Chinses Islamic stock with other countries in Table 5.24. Shows that there is positive significant mean spillover effect from Chinses Islamic stock market to all countries and negative significant mean

[10] Leverage effects: (*When positive shock has less effect on conditional variance as compared to a negative Shock know as leverage effect)*

spillover with Qatar. Our empirical results do not supports mean spillover effect for SriLanka. The leverage effects $\hat{\gamma}_2$ are negatively significant at 5% which indicate that good news creates less volatility than bad news. It suggests that negative shocks have a greater impact on volatility comparative to the positive shocks of the same magnitude and shows that if the risk of a business increase the investor will shift their funds to less risky investment. There is positive variance spillover for Canada, Indonesia, Pakistan, Turkey, UK, US, KSA and Taiwan Islamic stocks return. However, Islamic stocks of other countries in the study show no significant impact on volatility of Chines Islamic stocks returns. The application of EGARCH for identifying its asymmetric impact of Chinese Islamic stock returns, Islamic stocks returns Malaysia, Pakistan, Turkey, KSA, Dubai, Taiwan and Bahrain show change in the patterns of integration at variance level for some others countries Islamic stocks returns.

Table 5.23: Empirical Results of Asymmetric Analysis of Canada with Other Countries

		China	India	Indonesia	Japan	Kuwait	Malaysia	Pakistan	Sri-Lanka	Turkey	UK	US	Qatar	KSA	Dubai	Taiwan	Thailand	Bahrain
ARMA(p,q)		(1,0)	(0,0)	(0,0)	(1,1)	(1,0)	(0,[5])	(1,0)	(1,0)	([5],[5])	([6],[6])	(1,0)	(1,0)	([6],[6])	(0,1)	(1,1)	([4],[4])	(1,0)
GARCH(p,q)		(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)
Parameter		Coeff. (std. err.)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std. err.)
Mean eq	$\hat{\beta}_0$	-0.0004* (0.0003)	-0.0004 (0.0003)	-0.0004 (0.0003)	-0.0004* (0.0002)	-0.0004 (0.0003)	-0.0003 (0.0002)	-0.0004 (0.0003)	-0.0004 (0.0003)	-0.0004 (0.0003)	-0.0005** (0.0002)	-0.0007** (0.0002)	-0.0005* (0.0003)	-0.0004 (0.0002)	-0.0004 (0.0003)	-0.0003* (0.0001)	-0.0005 (0.0004)	-0.0004 (0.0003)
	$\hat{\beta}_1$	0.4329** (0.0304)	0.2120** (0.0207)	0.1304** (0.0206)	0.2389* (0.0233)	0.0009 (0.0412)	0.3024** (0.0333)	0.0036 (0.0217)	0.0617** (0.0292)	0.2019** (0.0199)	0.6572** (0.0162)	0.9508** (0.0253)	0.1224** (0.0234)	0.1873** (0.0223)	0.0323 (0.0258)	0.2662** (0.0278)	0.2148** (0.0256)	0.0105 (0.0172)
	$\hat{\beta}_2$	-0.0509** (0.0261)			0.2592** (0.0855)	0.0642** (0.0261)	-0.0462* (0.0266)	0.0648** (0.0260)	0.0554** (0.0264)	-0.2009** (0.0932)	-0.0773** (0.0279)	0.0472** (0.0205)	0.0567** (0.0257)	0.2016** (0.0949)	0.0583** (0.0263)	0.3752** (0.0865)	-0.3129** (0.1015)	0.0598** (0.0261)
	$\hat{\beta}_3$				-0.2468** (0.0891)					0.1855* (0.0957)	0.0978** (0.0375)			-0.2152** (0.0976)		-0.3866** (0.0915)	0.3110** (0.031)	
Variance eq	$\hat{\gamma}_0$	-0.2582** (0.0522)	-0.1282** (0.0283)	-0.1359** (0.0265)	-0.1938** (0.0306)	-0.1623** (0.0274)	-0.1613** (0.0378)	-0.1390** (0.0254)	-0.1826** (0.0377)	-0.1662** (0.0304)	-0.3153** (0.0762)	-7.0762** (1.6683)	-0.1489** (0.0264)	-0.1800** (0.0342)	-0.1539** (0.0264)	-0.2160** (0.0430)	-0.1788** (0.0342)	-0.1480** (0.026)
	$\hat{\gamma}_1$	0.0850** (0.0165)	0.0776** (0.0157)	0.0764** (0.0150)	0.0799** (0.0161)	0.0718** (0.0152)	0.0807* (0.0164)	0.0718** (0.0144)	0.0833** (0.0158)	0.0833** (0.0167)	0.1232** (0.0215)	0.2130** (0.0501)	0.0675** (0.0149)	0.0983** (0.0161)	0.0737** (0.0153)	0.0804** (0.0154)	0.0697** (0.0161)	0.0763** (0.0149)
	$\hat{\gamma}_2$	-0.0687** (0.0104)	-0.0666** (0.0083)	-0.0666** (0.0081)	-0.0809** (0.0092)	-0.0753** (0.0081)	-0.0681** (0.0088)	-0.0721** (0.0083)	-0.0771** (0.0090)	-0.0650** (0.0085)	-0.0534** (0.0117)	-0.0436 (0.0333)	-0.0703** (0.0082)	-0.0599** (0.0090)	-0.0757** (0.0087)	-0.0725** (0.0095)	-0.0704** (0.0083)	-0.0736** (0.0084)
	$\hat{\gamma}_3$	0.9797** (0.0053)	0.9915** (0.0026)	0.9910** (0.0026)	0.9858** (0.0030)	0.9884** (0.0026)	0.9888** (0.0038)	0.990** (0.0024)	0.9870** (0.0036)	0.9882** (0.0028)	0.9771** (0.0072)	0.2771 (0.1746)	0.9903** (0.0026)	0.9884** (0.0034)	0.9892** (0.0025)	0.9840** (0.0041)	0.9864** (0.0033)	0.9895** (0.0025)
	$\hat{\gamma}_4$	111.230** (45.342)	-42.7206 (30.156)	-14.9387 (15.3232)	52.7697* (27.4263)	95.910* (51.6271)	-3.0704 (77.529)	-13.5241* (8.2882)	34.310 (27.4581)	-18.4517 (32.9071)	50.5463 (33.815)	2189.936 (532.954)	10.663 (11.153)	20.70477 (16.9738)	17.0146 (13.03102)	126.58** (63.468)	31.5764 (31.0330)	-12.5295 (9.9320)

* Denotes significance at the 10% level.
** Denotes significance at the 5% level.

Table 5.24: Empirical Results of Asymmetric Analysis of China with Other Countries

		Canada	India	Indonesia	Japan	Kuwait	Malaysia	Pakistan	Sri-Lanka	Turkey	UK	US	Qatar	KSA	Dubai	Taiwan	Thailand	Bahrain
ARMA(p,q)		(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	([3],0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	([3],[2])	(1,0)	(1,0)	(1,0)	(1,0)
GARCH(p,q)		(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(0,1)	(1,1)	(1,1)	(1,1)	(2,1)	(1,1)	(1,1)
Parameter		Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std. err.)
Mean eq	$\hat{\beta}_0$	-5.32E-05 (0.0002)	5.07E-05 (0.0002)	1.77E-05 (0.0002)	-0.0002 (0.0002)	5.14E-05 (0.0002)	6.59E-05 (0.0002)	-5.36E-05 (0.0002)	-1.29E-05 (0.0002)	-4.41E-05 (0.0002)	-5.15E-05 (0.0002)	-0.0001 (0.0002)	-9.56E-06 (0.0002)	-0.0001 (0.0002)	-5.90E-05 (0.0002)	-7.28E-05 (0.0001)	-1.38E-05 (0.0002)	3.78E-05 (0.0002)
	$\hat{\beta}_1$	0.2131** (0.0163)	0.2937** (0.0149)	0.3154** (0.0142)	0.3091** (0.0149)	0.1643** (0.0306)	0.5774** (0.0202)	0.0737** (0.0145)	0.0051 (0.0192)	0.1885** (0.0183)	0.3158** (0.0159)	0.4219** (0.0242)	-0.0486** (0.0214)	0.1670** (0.0163)	0.1537** (0.0156)	0.4750** (0.0180)	0.3479** (0.0156)	0.0282** (0.0142)
	$\hat{\beta}_2$	0.1147** (0.0257)	0.0585** (0.0258)	0.0873** (0.0251)	0.1018** (0.0241)	0.1056** (0.0272)	0.0705** (0.0242)	-0.0455* (0.0246)	0.1176** (0.0273)	0.1123** (0.0271)	0.0964** (0.0245)	0.1028** (0.0270)	0.1179** (0.0273)	0.1059** (0.0270)	0.0916** (0.0273)	0.0790 (0.0269)	0.0921** (0.0245)	0.1140** (0.0274)
Variance eq	$\hat{\gamma}_0$	-0.4302** (0.1128)	-0.2242** (0.0588)	-0.3018** (0.0687)	-0.1412** (0.0258)	-0.1948** (0.0328)	-0.6417** (0.1337)	-0.1239** (0.0176)	-0.1798** (0.0340)	-0.2282** (0.0377)	-0.3885** (0.0911)	-10.071** (0.0572)	-0.1627** (0.0269)	-0.1346** (0.0224)	-0.1802** (0.0311)	-0.6637** (0.1342)	-0.4087** (0.0786)	-0.1607** (0.0266)
	$\hat{\gamma}_1$	0.0354** (0.0150)	0.0792** (0.0138)	0.0624** (0.0134)	0.0178** (0.0095)	0.0544** (0.0122)	0.0482** (0.0161)	0.01470* (0.0075)	0.0359** (0.0101)	0.0455** (0.0139)	0.0441** (0.0145)	0.0428 (0.0454)	0.0374** (0.0102)	0.0243** (0.0098)	0.0431** (0.0114)	0.2384** (0.0302)	0.0267* (0.0139)	0.0431** (0.0107)
	$\hat{\gamma}_2$	-0.1099** (0.0140)	-0.0644** (0.0104)	-0.0720** (0.0096)	-0.0905** (0.0087)	-0.0799** (0.0080)	-0.0923** (0.0128)	-0.0877** (0.0077)	-0.0922** (0.0087)	-0.0950** (0.0095)	-0.09215** (0.0116)	-0.0604* (0.03198)	-0.0896** (0.0079)	-0.0922** (0.0088)	-0.0821** (0.0082)	-0.0926** (0.0175)	-0.0897** (0.0100)	-0.0875** (0.0083)
	$\hat{\gamma}_3$	0.9594** (0.0110)	0.9826** (0.0054)	0.9738** (0.0067)	0.9867** (0.0026)	0.9837** (0.0031)	0.9413** (0.0127)	0.9884** (0.0018)	0.9839** (0.0033)	0.9804** (0.0035)	0.9643** (0.0089)		0.9851** (0.0027)	0.9879** (0.0022)	0.9842** (0.0030)	0.2189 (0.0537)	0.9615** (0.0075)	0.9860** (0.0026)
	$\hat{\gamma}_4$															0.7355** (0.0549)		
	$\hat{\gamma}_5$	101.2971** (37.8843)	-11.6563 (40.262)	18.590** (20.782)	10.8061 (13.369)	8.4581 (45.0847)	514.8089 (149.928)	30.9034** (5.7079)	15.193 (20.1093)	67.6950* (36.3757)	88.5662** (33.5018)	5961.1** (422.986)	-5.1373 (8.3376)	19.2617** (7.9190)	-5.1191 (9.8633)	419.13** (210.308)	146.0815 (37.723)	-11.4276 (7.3579)

* Denotes significance at the 10% level.
** Denotes significance at the 5% level.

3. India

The analysis of India with other countries for asymmetric impact. The results show that there is positive significant mean spillover from Indian Islamic stock market to all countries. Our empirical results do not supports mean spillover effect for following countries Qatar and Bahrain. The leverage effects $\hat{\gamma}_2$ are negative at 5% significant level for all countries which shows that bad news creates more volatility then good news. It implies that negative shocks have a greater influence on volatility relative to the positive shocks of the same degree and indicates that if the risk of a business goes up the investor will shift their funds to less risky investment. There is also positive variance spillover for China, Indonesia, SriLanka, Taiwan and Thailand Islamic stocks return, while negative volatility spillover effect of Kuwait Islamic stocks. However, Islamic stocks of other countries in the study show no significant iinpact on volatility of Indian Islamic stocks returns. After applying EGARCH for identifying its asymmetric impact of Indian Islamic stock returns, Islamic stocks return of Canada, Kuwait, US, and Qatar have showed change in the patterns of integration at variance level. Results can be verified from Table 5.25

4. Indonesia

Indonesian Islamic stock showed positive significant mean spillover effect with all countries. Our empirical results do not supports mean spillover effect for following countries Bahrain. The leverage effects $\hat{\gamma}_2$ are almost negative at 5% significant level which means that good news generates less volatility than bad news. It implies that negative shocks have a greater effect on volatility relative to the positive shocks of the same magnitude and indicates that if the risk of a business goes up the investor will shift their funds to less risky investment. In addition, there is positive variance spillover for China, India, Malaysia, Turkey, and Taiwan Islamic stocks. However, Islamic stocks of other countries in the study show no significant

impact on volatility of Indonesian Islamic stocks returns. With the application of EGARCH for identifying asymmetric impact of Indonesian Islamic stock the Islamic stocks of SriLanka, Turkey, US, Dubai and Bahrain have noted change in the patterns of integration at variance level in Table 5.26.

Table 5.25: Empirical Results of Asymmetric Analysis of India with Other Countries

		Canada	China	Indonesia	Japan	Kuwait	Malaysia	Pakistan	Sri-Lanka	Turkey	UK	US	Qatar	KSA	Dubai	Taiwan	Thailand	Bahrain
ARMA(p,q)		(1,0)	([5],0)	(1,1)	([5],0)	(1,0)	(1,0)	(1,0)	([6],1)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)
GARCH(p,q)		(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)
Parameter		Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std. err.)
Mean eq	$\hat{\beta}_0$	-0.0001 (0.0003)	-5.84E-05 (0.0003)	-0.0002 (0.0002)	-0.0001 (0.0003)	-7.01E-05 (0.0003)	6.53E-05 (0.0003)	-0.0002 (0.0003)	2.64E-05 (0.0003)	-0.0002 (0.0003)	-0.0001 (0.0003)	-0.0004 (0.0003)	-9.03E-05 (0.0003)	-3.84E-05 (0.0003)	-0.0001 (0.0003)	-0.0002 (0.0003)	-0.0001 (0.0003)	-7.13E-05 (0.0003)
	$\hat{\beta}_1$	0.2496** (0.0205)	0.5544** (0.0225)	0.3743** (0.0193)	0.1908** (0.0248)	0.1580** (0.0398)	0.5749** (0.0266)	0.1254** (0.0244)	0.0682** (0.0274)	0.2694** (0.0232)	0.3669** (0.0199)	0.3852** (0.0260)	-0.0250 (0.0232)	0.2166** (0.0208)	0.2095** (0.0221)	0.3355** (0.0254)	0.4326** (0.0218)	0.0014 (0.0186)
	$\hat{\beta}_2$	0.0844** (0.0255)	0.0440** (0.0214)	0.1495** (0.0619)	0.0511** (0.0236)	0.0837** (0.0260)	0.0451* (0.0244)	0.0785** (0.0260)	-0.0497* (0.0262)	0.0744** (0.0258)	0.0725** (0.0239)	0.0789** (0.0245)	0.0873** (0.0264)	0.0827** (0.0259)	0.0747** (0.0257)	0.0607** (0.0254)	0.0498** (0.2466)	0.0885** (0.0266)
	$\hat{\beta}_3$			-0.1208* (0.0675)														
Variance eq	$\hat{\gamma}_0$	-0.4902** (0.1067)	-0.4733** (0.0999)	-0.8505** (0.1788)	-0.3933** (0.0695)	-0.3628** (0.0652)	-0.4495** (0.0937)	-0.3846** (0.0656)	-0.4930** (0.0796)	-0.5143** (0.1081)	-0.4431** (0.0898)	-0.4490** (0.0806)	-0.4069** (0.0683)	-0.3121** (0.0586)	-0.3713** (0.0655)	-0.4640** (0.0913)	-0.5641** (0.1211)	-0.4638** (0.0769)
	$\hat{\gamma}_1$	0.1022** (0.0189)	0.1138** (0.0204)	0.1076** (0.0217)	0.1134** (0.0182)	0.1004** (0.0176)	0.1156** (0.0203)	0.1004** (0.0170)	0.0898** (0.0162)	0.1057** (0.0194)	0.1136** (0.0195)	0.1217** (0.0196)	0.1057** (0.0175)	0.0994** (0.0163)	0.1125** (0.0180)	0.1084** (0.0180)	0.1135** (0.0194)	0.1067** (0.0179)
	$\hat{\gamma}_2$	-0.0794** (0.0126)	-0.0533** (0.0131)	-0.0812** (0.0144)	-0.0705** (0.0100)	-0.0770** (0.0092)	-0.0536** (0.0150)	-0.0732** (0.0092)	-0.0770** (0.0098)	-0.0852** (0.0111)	-0.0778** (0.0120)	-0.0754** (0.0110)	-0.0764** (0.0090)	-0.0651** (0.0107)	-0.0647** (0.0098)	-0.0766** (0.0106)	-0.0669** (0.0134)	-0.0795** (0.0089)
	$\hat{\gamma}_3$	0.9543** (0.0109)	0.9587** (0.0099)	0.9169** (0.0190)	0.9649** (0.0072)	0.9672* (0.0068)	0.9602** (0.0097)	0.9652** (0.0069)	0.9534** (0.0083)	0.9521** (0.0111)	0.9602** (0.0092)	0.9602** (0.0084)	0.9630** (0.0072)	0.9731** (0.0061)	0.9676** (0.0068)	0.9592** (0.0088)	0.9488** (0.01221)	0.9572** (0.0081)
	$\hat{\gamma}_4$	26.7168 (26.930)	110.703** (52.13)	118.237** (44.5186)	-27.7266 (36.8075)	-73.021* (44.5260)	20.227 (77.681)	5.5248 (15.310)	119.46** (43.894)	60.027 (76.433)	-11.503 (26.1133)	26.5896 (47.0774)	2.2354 (12.519)	-15.955 (13.142)	-16.572 (13.301)	182.246* (97.230)	109.142** (53.4424)	19.340 (14.7114)

* Denotes significance at the 10% level.
** Denotes significance at the 5% level.

Table 5.26: Empirical Results of Asymmetric Analysis of Indonesia with Other Countries

		Canada	China	India	Japan	Kuwait	Malaysia	Pakistan	Sri-Lanka	Turkey	UK	US	Qatar	KSA	Dubai	Taiwan	Thailand	Bahrain
ARMA(p,q)		([2],0)	([2],0)	([2],0)	([2],0)	([2],0)	([2],0)	([2],0)	([2],0)	([2],0)	([3],0)	([2],0)	([2],0)	([2],0)	([2],0)	([2],0)	([2],0)	([2],0)
GARCH(p,q)		(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)
Parameter		Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)
Mean eq	$\hat{\beta}_0$	0.0002 (0.0003)	0.0001 (0.0003)	0.0002 (0.0003)	-8.59E-05 (0.0003)	0.0002 (0.0003)	5.08E-05 (0.0003)	-3.61E-05 (0.0003)	0.0001 (0.0003)	-9.22E-05 (0.0003)	0.0002 (0.0003)	1.24E-05 (0.0003)	-5.48E-05 (0.0003)	0.0002 (0.0003)	9.69E-05 (0.0003)	8.99E-05 (0.0003)	4.87E-06 (0.00029)	0.0001 (0.0003)
	$\hat{\beta}_1$	0.1531** (0.0192)	0.5885** (0.0219)	0.3469** (0.0200)	0.2469** (0.0216)	0.1649** (0.0350)	0.6620** (0.0269)	0.1034** (0.0189)	0.0555** (0.0272)	0.2229** (0.0242)	0.2113** (0.0197)	0.1014** (0.0245)	0.0075** (0.0056)	0.1538** (0.0245)	0.1735** (0.0181)	0.2637** (0.0270)	0.4088** (0.0206)	0.0227 (0.0175)
	$\hat{\beta}_2$	-0.0639** (0.0253)	0.0001** (0.0003)	-0.0687** (0.0230)	-0.0575** (0.0241)	-0.0599** (0.0252)	-0.0673** (0.0233)	-0.0535** (0.0256)	-0.0574** (0.0256)	-0.0529** (0.0252)	-0.0849** (0.0261)	-0.0491* (0.0255)	-0.0541** (0.0252)	-0.0607** (0.0251)	-0.0617** (0.0242)	-0.0543** (0.0255)	-0.0563** (0.0242)	-0.052** (0.0254)
Variance eq	$\hat{\gamma}_0$	-0.4054** (0.0763)	-0.6655** (0.1129)	-0.4414** (0.0934)	-0.4500** (0.0837)	-0.3808** (0.0673)	-0.7686** (0.1461)	-0.3818** (0.0684)	-0.3577** (0.0627)	-0.5399** (0.0959)	-0.3840** (0.0675)	-0.3518** (0.0623)	-0.3467** (0.0602)	-0.3713** (0.0659)	-0.4021** (0.0706)	-0.5752** (0.1035)	-0.43931** (0.0951)	-0.3911** (0.0720)
	$\hat{\gamma}_1$	0.1720** (0.0229)	0.2084** (0.0235)	0.1712** (0.0205)	0.1805** (0.0250)	0.1606** (0.0229)	0.1624** (0.0238)	0.1499** (0.0221)	0.1511** (0.0221)	0.1313** (0.0203)	0.1584** (0.0199)	0.1450** (0.0210)	0.1464** (0.0204)	0.1657** (0.0216)	0.1587** (0.0226)	0.1658** (0.0234)	0.1428** (0.0213)	0.1529** (0.0219)
	$\hat{\gamma}_2$	-0.0676** (0.0136)	-0.0398** (0.0131)	-0.0490** (0.0133)	-0.0736** (0.0136)	-0.0757** (0.0128)	-0.0904** (0.0158)	-0.0746** (0.0123)	-0.0776** (0.0124)	-0.0789** (0.0132)	-0.0575** (0.0130)	-0.0819** (0.0123)	-0.0774** (0.0123)	-0.0715** (0.0123)	-0.0752** (0.0127)	-0.0589** (0.0150)	-0.0496** (0.1037)	-0.0787** (0.0128)
	$\hat{\gamma}_3$	0.9688** (0.0076)	0.9455** (0.0112)	0.9659** (0.0092)	0.9648** (0.0084)	0.9704** (0.0068)	0.9325** (0.0146)	0.9698** (0.0068)	0.9721** (0.0063)	0.9544** (0.0095)	0.9709** (0.0068)	0.9723** (0.0063)	0.9731** (0.0060)	0.9720** (0.0066)	0.9679** (0.0070)	0.9542** (0.0099)	0.9641** (0.0097)	0.9690** (0.0071)
	$\hat{\gamma}_4$	-3.6262 (27.105)	146.19** (62.202)	38.929 (64.473)	11.950 (52.571)	-28.741 (79.7180)	488.076** (126.379)	19.807 (13.039)	-15.0438 (35.7075)	277.62** (82.746)	35.835 (22.1967	-11.334 (18.219)	-0.3340 (1.3799)	-8.0502 (21.251)	-6.1639 (21.509)	429.90** (109.662)	65.632 (58.779)	11.0925 (15.5791)

* Denotes significance at the 10% level.
** Denotes significance at the 5% level.

5. Japan

In table 5.27 Japan shows positive significant mean spillover with all countries expect Bahrain. The negatively significant leverage effects $\hat{\gamma}_2$ means that good news causes less volatility than bad news. It implies that negative shocks have a more influence on volatility compared to the positive shocks of the same magnitude and indicates that if the risk of a business goes up the investor will shift their funds to less risky investmentst. There is positive variance spillover for Canada, China, Kuwait, Malaysia, Turkey, UK, US, KSA, Dubai, Taiwan, and Thailand Islamic stocks. However, Islamic stocks of other countries in the study show no significant impact on volatility of Japanese Islamic stocks returns. With the application of EGARCH for identifying its asymmetric impact of Japanese Islamic stock the Islamic stocks of have change in the patterns of integration at variance level.

6. Kuwait

Concentrating on the asymmetric impact of shocks on volatility of Kuwaiti Islamic stock returns from Table 5.28 empirical results of the analysis showed positive significant mean spillover from Kuwait Islamic stock market to all countries. Our empirical results do not supports mean spillover effect for following countries Bahrain. The leverage effects $\hat{\gamma}_2$ are negative at 5% level of significant which means that good news generates less volatility than bad news. It implies that negative shocks have a greater influence on volatility relative to the positive shocks of the same magnitude and indicates that if the risk of a business increase the investor will shift their funds to less risky investment. There is positive variance spillover for India, Malaysia, Qatar, KSA, and Dubai Islamic stocks, while negative volatility spillover effect of Taiwan Islamic stocks. However, Islamic stocks of other countries in the study show no significant impact on volatility of Kuwaiti Islamic stocks returns. After applying EGARCH for identifying asymmetric impact of Kuwaiti Islamic stock, some countries Islamic stocks

returns like Canada, china, India, Pakistan, UK, US, Dubai, Taiwan, Thailand like have changed their behavior in spillover effect at integration level.

Table 5.27: Empirical Results of Asymmetric Analysis of Japan with Other Countries

		Canada	China	India	Indonesia	Kuwait	Malaysia	Pakistan	Sri-Lanka	Turkey	UK	US	Qatar	KSA	Dubai	Taiwan	Thailand	Bahrain
ARMA(p,q)		([6],0)	(1,0)	([6],0)	([6],0)	(1,0)	(1,0)	([6],0)	([6],0)	([6],0)	([6],0)	([6],0)	([6],0)	(1,0)	(1,0)	([6],0)	([6],0)	(1,0)
GARCH(p,q)		(2,1)	(1,1)	(1,1)	(2,1)	(1,1)	(1,1)	(2,1)	(2,1)	(2,1)	(2,1)	(2,1)	(2,1)	(1,1)	(1,1)	(2,1)	(2,1)	(1,1)
Parameter		Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)
Mean eq	$\hat{\beta}_0$	7.21E-05 (0.0002)	0.0001 (0.0002)	1.57E-05 (0.0002)	-1.81E-05 (0.0002)	0.0003 (0.0002)	0.0002 (0.0002)	8.29E-06 (0.0002)	6.91E-05 (0.0002)	5.72E-05 (0.0002)	0.0001 (0.0002)	-4.40E-05 (0.0002)	2.51E-05 (0.0002)	0.0001 (0.0002)	0.0002 (0.0002)	-1.29E-05 (0.0002)	1.65E-05 (0.0004)	0.0001 (0.0002)
	$\hat{\beta}_1$	0.1612** (0.0179)	0.4089** (0.0158)	0.1194** (0.0184)	0.1872** (0.0171)	0.0943** (0.0342)	0.3317** (0.0237)	0.0231 (0.0170)	0.0099 (0.0230)	0.0986** (0.0214)	0.2200** (0.0160)	0.2521** (0.0250)	0.0919** (0.0196)	0.0990** (0.0185)	0.0938** (0.0180)	0.1443** (0.0202)	0.1740** (0.0183)	-0.0040 (0.0158)
	$\hat{\beta}_2$	-0.0569** (0.0236)	-0.1474** (0.0253)	-0.0554** (0.0242)	-0.0503** (0.0234)	-0.1152** (0.0271)	-0.1268** (0.0263)	-0.0505** (0.0245)	-0.0485 (0.0245)	-0.0589** (0.0244)	-0.0588** (0.0222)	-0.0541** (0.0232)	-0.0525** (0.0249)	-0.1175** (0.0268)	-0.1204** (0.0267)	-0.0620** (0.0244)	-0.0501** (0.2432)	-0.1113** (0.0266)
Variance eq	$\hat{\gamma}_0$	-0.8626** (0.1273)	-1.1189** (0.1562)	-0.6203** (0.0871)	-0.6954** (0.0935)	-0.6408** (0.0707)	-1.0796** (0.1419)	-0.5867** (0.0685)	-0.5487** (0.0706)	-0.6842** (0.0827)	-0.8503** (0.1205)	-0.7344** (0.0989)	-0.5962** (0.0692)	-0.6159** (0.0722)	-0.6246** (0.0721)	-0.6758** (0.1001)	-0.7650** (0.0914)	-0.5850** (0.0694)
	$\hat{\gamma}_1$	0.1703** (0.0205)	0.1678** (0.02070)	0.1753** (0.0192)	0.1670** (0.0199)	0.1388** (0.0183)	0.1484** (0.0220)	0.1587** (0.0176)	0.1564** (0.0171)	0.1580** (0.0186)	0.1839** (0.0213)	0.1809** (0.0211)	0.1699** (0.0187)	0.1472** (0.0181)	0.1517** (0.0179)	0.1634** (0.0197)	0.1540** (0.0191)	0.1567** (0.0175)
	$\hat{\gamma}_2$	-0.1478** (0.0151)	-0.1554** (0.0155)	-0.1340** (0.0141)	-0.1514** (0.0150)	-0.1105** (0.0147)	-0.1496** (0.0140)	-0.1357** (0.0132)	-0.1340** (0.0131)	-0.1352** (0.0146)	-0.1406** (0.0152)	-0.1269** (0.0148)	-0.1273** (0.0145)	-0.1123** (0.0151)	-0.1232** (0.0136)	-0.1382** (0.0147)	-0.1419** (0.0136)	-0.1295** (0.0124)
	$\hat{\gamma}_3$	0.9228** (0.0127)	0.8963** (0.0156)	0.9467** (0.0086)	0.9385** (0.0095)	0.9439** (0.0072)	0.9011** (0.0139)	0.9487** (0.0072)	0.9523** (0.0073)	0.9406** (0.0082)	0.9247** (0.0118)	0.9367** (0.0097)	0.9493** (0.0071)	0.9463** (0.0074)	0.9453** (0.0074)	0.9419** (0.0094)	0.9315** (0.0093)	0.9486** (0.0072)
	$\hat{\gamma}_4$	133.735** (51.625)	216.044** (75.693)	0.8690 (65.3931)	21.238 (34.052)	404.952** (70.060)	716.448** (163.95)	-7.7084 (12.0328)	-40.3478 (48.677)	166.327** (68.2473)	107.54** (45.451)	180.234** (58.604)	36.388 (22.807)	88.305** (24.369)	66.540** (22.969)	203.295* (108.881)	149.344** (53.866)	-13.7879 (19.0314)

* Denotes significance at the 10% level.
** Denotes significance at the 5% level.

Table 5.28: Empirical Results of Asymmetric Analysis of Kuwait with Other Countries

		Canada	China	India	Indonesia	Japan	Malaysia	Pakistan	Sri-Lanka	Turkey	UK	US	Qatar	KSA	Dubai	Taiwan	Thailand	Bahrain
ARMA(p,q)		([3],0)	([3],0)	([3],0)	([2],0)	([2],0)	([3],0)	([2],0)	([2],0)	([3],0)	([2],0)	([2],0)	([2],0)	([3],0)	([3],0)	([3],0)	([3],0)	([5],0)
GARCH(p,q)		(2,1)	(1,1)	(2,1)	(1,1)	(1,1)	(1,1)	(0,1)	(0,1)	(2,1)	(1,1)	(1,1)	(0,1)	(1,1)	(2,1)	(2,1)	(1,1)	(1,1)
Parameter		Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)
Mean eq	$\hat{\beta}_0$	-0.0003* (0.0001)	-0.0003* (0.0001)	-0.0003** (0.0002)	-0.0003** (0.0001)	-0.0003* (0.0001)	-0.0003* (0.0001)	-0.0006** (0.0002)	-0.0003* (0.0002)	-0.0003** (0.0001)	-0.0003* (0.0001)	-0.0003* (0.0001)	-0.0003** (0.0001)	-0.0003* (0.0001)	-0.0004** (0.0001)	-0.0003* (0.0001)	-0.0002* (0.0001)	-0.0004** (0.0002)
	$\hat{\beta}_1$	0.0245** (0.0125)	0.0835** (0.0135)	0.0334** (0.0103)	0.0513** (0.0104)	0.0344** (0.0117)	0.0988** (0.0163)	0.0767** (0.0124)	0.0351* (0.0173)	0.0365** (0.0119)	0.0574** (0.0118)	0.0553** (0.0167)	0.0553** (0.0013)	0.0997** (0.0147)	0.1503** (0.0102)	0.0487** (0.0133)	0.0455** (0.0122)	0.0109 (0.0119)
	$\hat{\beta}_2$	0.0807** (0.0257)	0.0742** (0.0262)	0.0840** (0.0257)	0.0843** (0.0258)	0.0872** (0.0254)	0.0674** (0.0262)	0.082** (0.0168)	0.0978** (0.01700)	0.0791** (0.0257)	0.0569** (0.0289)	0.0616** (0.0294)	0.0585* (0.0299)	0.0539** (0.0204)	0.0862** (0.0262)	0.0909** (0.0255)	0.0737** (0.0256)	0.04133** (0.0126)
Variance eq	$\hat{\gamma}_0$	-0.8266** (0.0823)	-0.7369** (0.0604)	-0.7455** (0.0711)	-0.7908** (0.0749)	-0.7787** (0.0762)	-0.8809** (0.0697)	-10.091** (0.0277)	-10.070** (0.0278)	-0.8157** (0.0768)	-0.7013** (0.0633)	-0.7562** (0.0601)	-1.6441** (0.1504)	-7.9013** (0.8804)	-1.1492** (0.1547)	-0.6934** (0.0744)	-0.7641** (0.0637)	-10.011** (0.0275)
	$\hat{\gamma}_1$	0.1364** (0.01512)	0.1272** (0.0123)	0.1314** (0.0144)	0.1455** (0.0150)	0.1425** (0.0153)	0.1536** (0.0143)	0.1747** (0.0185)	0.1590** (0.0189)	0.1365** (0.0155)	0.1289** (0.0119)	0.1310** (0.0125)	0.1473** (0.0165)	0.1098** (0.0283)	0.1891** (0.0190)	0.1348** (0.0146)	0.1218** (0.0124)	0.1475** (0.0169)
	$\hat{\gamma}_2$	-0.2178** (0.0111)	-0.1546** (0.0095)	-0.2121** (0.0109)	-0.2135** (0.0106)	-0.2142** (0.0111)	-0.1474** (0.0094)	-0.1029** (0.0140)	-0.1413** (0.0146)	-0.2159** (0.0113)	-0.1462** (0.0088)	-0.1527** (0.0094)	-0.1546** (0.0117)	-0.1561** (0.0249)	-0.1924** (0.0124)	-0.2125** (0.0108)	-0.1444** (0.0092)	-0.1381** (0.0137)
	$\hat{\gamma}_3$	0.2415** (0.0327)	0.9366** (0.0054)	0.2343** (0.0318)	0.2036** (0.0260)	0.2245** (0.0301)	0.9256** (0.0061)			0.2325** (0.0318)	0.9395** (0.0058)	0.9350** (0.0054)	0.8519** (0.0141)	0.2629** (0.0826)	0.1949 (0.0346)	0.2316** (0.0307)	0.9350** (0.0056)	
	$\hat{\gamma}_4$	0.6866** (0.0327)		0.6999** (0.0317)	0.7282** (0.0264)	0.7080** (0.0301)				0.6962** (0.0312)			0.8519** (0.0141)		0.7066** (0.0326)	0.7079** (0.0307)		
	$\hat{\gamma}_5$	9.8370 (23.0854)	35.021 (34.268)	-82.6631* (43.9558)	-19.471 (22.2033)	-35.100 (44.587)	249.22** (95.5202)	135.213 (169.001)	129.547 (190.407)	-20.0765 (46.1702)	-20.879 (21.2382)	50.897 (37.4665)	291.477** (93.161)	2313.4** (284.539)	94.555 (43.7173)	-160.391** (65.415)	138.195 (34.569)	-113.03 (91.4747)

* Denotes significance at the 10% level.
** Denotes significance at the 5% level.

7. Malaysia

EGARCH model is applied to find the asymmetric impact of shocks on Malaysian Islamic stock. The Table 5.29. The results imply that there is positive significant mean spillover from Malaysian Islamic stock market to all countries. However, our empirical result doesn't supports mean spillover effect form Qatar and Bahrain. The leverage effects $\hat{\gamma}_2$ are negative at 5% significant level which means that good news generates less volatility than bad news. It implies that negative shocks have a greater influence on volatility relative to the positive shocks of the same magnitude and indicates that if the risk of a business goes up the investor will shift their funds to less risky investment. there is positive variance spillover for Canada, China, Indonesia, UK, US, KSA, Taiwan and Thailand Islamic stocks, while negative volatility spillover effect of India, Kuwait, Turkey, Qatar, and Dubai Islamic stocks. Although, Islamic stocks of other countries in the study show no significant impact on volatility of Malaysian Islamic stocks returns. After application of EGARCH Indonesia, Kuwait, SriLanka, turkey, UK, Qatar, Thailand, and Bahrain Islamic stock returns have showed change in the performance of integration at variance level.

8. Pakistan

Focusing on the asymmetric impact of shocks on volatility, the analysis of Pakistan with other countries. Table 5.30 show empirical results of the analysis. The results imply that there is positive significant mean spillover from Pakistani Islamic stock market to all countries. However, our empirical result doesn't supports mean spillover effect from Taiwan. The leverage effects $\hat{\gamma}_2$ are almost negative at 5% significant level which means that good news generates less volatility than bad news. It implies that negative shocks have a greater influence on volatility relative to the positive shocks of the same magnitude and indicates that if the risk of a business goes up the investor will shift their funds to less risky investment. In addition,

there is positive variance spillover for Canada, China, India, Indonesia, Kuwait, UK, US, KSA, Taiwan, Bahrain and Thailand Islamic stocks. However, Islamic stocks of other countries in the study show no significant impact on volatility of Pakistani Islamic stocks returns. With the application of EGARCH for identifying its asymmetric impact of Pakistani Islamic stock returns, Indonesia, Japan, SriLanka, Turkey, and Qatar have change their in the patterns of integration at variance level.

Table 5.29: Empirical Results of Asymmetric Analysis of Malaysia with Other Countries

		Canada	China	India	Indonesia	Japan	Kuwait	Pakistan	Sri-Lanka	Turkey	UK	US	Qatar	KSA	Dubai	Taiwan	Thailand	Bahrain
ARMA(p,q)		(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	([2],0)	(1,0)	(1,0)
GARCH(p,q)		(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)
Parameter		Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)
Mean eq	$\hat{\beta}_0$	-8.21E-05 (0.0002)	-7.69E-05 (0.0002)	-5.90E-05 (0.0002)	-0.0001 (0.0002)	-0.0001 (0.0002)	-9.13E-05 (0.0002)	-0.0002 (0.0002)	-0.0001 (0.0002)	-0.0002 (0.0002)	-0.0001 (0.0002)	-0.0002 (0.0002)	-0.0001 (0.0002)	-8.27E-05 (0.0002)	-0.0002 (0.0002)	-0.0001 (0.0002)	-0.0001 (0.0002)	-9.64E-05 (0.0002)
	$\hat{\beta}_1$	0.1328** (0.0135)	0.4500** (0.0152)	0.2531** (0.0127)	0.2861** (0.0123)	0.2116** (0.0144)	0.1564** (0.0249)	0.0852** (0.0161)	0.0429** (0.0148)	0.1881** (0.0140)	0.1970** (0.0152)	0.1870** (0.0205)	0.0304 (0.0193)	0.1512** (0.0156)	0.1531** (0.0146)	0.1809** (0.0165)	0.2883** (0.0148)	0.0079 (0.0124)
	$\hat{\beta}_2$	0.1112** (0.0268)	0.0633** (0.0223)	0.0812** (0.0242)	0.1071** (0.0231)	0.1032** (0.0233)	0.0909** (0.0257)	0.0905** (0.0253)	0.0921** (0.0263)	0.0920** (0.0248)	0.1033** (0.0256)	0.1096** (0.0258)	0.0983** (0.0257)	0.0870** (0.0259)	0.0829** (0.0251)	0.1032** (0.0255)	0.0822** (0.0247)	0.1008** (0.0256)
Variance eq	$\hat{\gamma}_0$	-0.5934** (0.0817)	-0.4919** (0.0905)	-0.2100** (0.0420)	-0.3378** (0.0698)	-0.1690** (0.0293)	-0.1495** (0.0282)	-0.1484** (0.0274)	-0.1819** (0.0305)	-0.1434** (0.0270)	-0.3013** (0.0546)	-0.2918** (0.0476)	-0.1847** (0.0337)	-0.3730** (0.0736)	-0.1637** (0.0330)	-0.5440** (0.1047)	-0.3745** (0.0727)	-0.1953** (0.0339)
	$\hat{\gamma}_1$	0.1028** (0.0205)	0.0968** (0.0194)	0.0978** (0.0160)	0.0886** (0.0166)	0.0318** (0.0106)	0.0557** (0.0127)	0.0462** (0.0111)	0.0586** (0.0128)	0.0531** (0.0117)	0.0721** (0.0156)	0.0608** (0.0145)	0.0591** (0.0197)	0.0977** (0.0193)	0.0506** (0.0125)	0.0900** (0.0191)	0.0625** (0.0182)	0.0597** (0.0127)
	$\hat{\gamma}_2$	-0.0782** (0.0116)	-0.0559** (0.0107)	-0.0462** (0.0104)	-0.0512** (0.0097)	-0.0682** (0.0072)	-0.0589** (0.0078)	-0.0628** (0.0071)	-0.0607** (0.0076)	-0.0659** (0.0074)	-0.0689** (0.0103)	-0.0693** (0.0092)	-0.0596** (0.0076)	-0.0487** (0.0108)	-0.0557** (0.0080)	-0.0665** (0.0111)	-0.0631** (0.0098)	-0.0606** (0.0077)
	$\hat{\gamma}_3$	0.9491** (0.0072)	0.9592** (0.0080)	0.9858** (0.0036)	0.9729** (0.0062)	0.9853** (0.0027)	0.9885** (0.0024)	0.9881** (0.0023)	0.9856** (0.0026)	0.9887** (0.0024)	0.9751** (0.0048)	0.9754** (0.0043)	0.9853** (0.0029)	0.9696** (0.0064)	0.9868** (0.0029)	0.9552** (0.0088)	0.9679** (0.0062)	0.9843** (0.0029)
	$\hat{\gamma}_4$	122.296** (26.293)	110.50** (41.809)	-16.790** (28.610)	20.576** (20.652)	24.823 (20.2856)	-38.617** (46.1346)	-5.3507 (7.6420)	5.9558 (17.320)	-44.9189* (25.707)	34.300* (19.560)	94.979** (32.7040)	-3.270** (9.8019)	46.544** (21.6592)	-9.4148 (10.2137)	415.072** (126.017)	100.4335** (31.534)	1.7856 (6.2811)

* Denotes significance at the 10% level.
** Denotes significance at the 5% level.

Table 5.30: Empirical Results of Asymmetric Analysis of Pakistan with Other Countries

		Canada	China	India	Indonesia	Japan	Kuwait	Malaysia	Sri-Lanka	Turkey	UK	US	Qatar	KSA	Dubai	Taiwan	Thailand	Bahrain
ARMA(p,q)		(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)
GARCH(p,q)		(0,1)	(1,1)	(0,1)	(0,1)	(0,1)	(0,1)	(0,1)	(0,1)	(0,1)	(0,1)	(0,1)	(0,1)	(0,1)	(0,1)	(0,1)	(0,1)	(0,1)
Parameter		Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)
Mean eq	$\hat{\beta}_0$	0.0013** (0.0002)	0.0010** (0.0002)	0.0012** (0.0002)	0.0012** (0.0002)	0.0012** (0.0002)	0.0013** (0.0002)	0.0014** (0.0002)	0.0012** (0.0002)	0.0012** (0.0002)	0.0012** (0.0002)	0.0013** (0.0002)	0.0015** (0.0003)	0.0013** (0.0002)	0.0012** (0.0002)	0.0013** (0.0002)	0.0013** (0.0002)	0.0013** (0.0002)
	$\hat{\beta}_1$	0.0363* (0.0194)	0.1669** (0.0195)	0.0992** (0.0152)	0.0696** (0.0159)	0.0607** (0.0187)	0.1021** (0.0315)	0.0760** (0.0209)	0.0903** (0.0228)	0.0508** (0.0188)	0.0651** (0.0172)	0.0316 (0.0249)	0.0661** (0.0177)	0.1139** (0.0191)	0.1095** (0.0211)	0.0268 (0.0195)	0.1436** (0.02003)	0.0330* (0.0169)
	$\hat{\beta}_2$	0.1247** (0.0199)	0.1719** (0.0233)	0.1282** (0.0189)	0.1192** (0.0192)	0.1129** (0.0190)	0.1177** (0.0207)	0.1073** (0.0219)	0.1197** (0.0204)	0.1129 (0.0194)	0.1372** (0.0192)	0.1197** (0.0190)	0.0815** (0.0172)	0.1182** (0.0204)	0.1073** (0.0227)	0.1187** (0.0217)	0.1214** (0.0200)	0.1006** (0.0200)
Variance eq	$\hat{\gamma}_0$	-9.8181** (0.0549)	-2.7667** (0.3448)	-9.9947** (0.0750)	-9.6285** (0.0362)	-9.5479** (0.0560)	-9.6479** (0.0439)	-9.9853** (0.0696)	-9.6077** (0.0467)	-9.6302** (0.0570)	-9.7301** (0.0496)	-9.7394** (0.0448)	-9.6923** (0.0330)	-9.8483** (0.0471)	-9.6885** (0.0314)	-10.159** (0.0798)	-9.7442** (0.0501)	-9.6234** (0.0348)
	$\hat{\gamma}_1$	0.5195** (0.0224)	0.5377** (0.0325)	0.5098** (0.0204)	0.4844** (0.0204)	0.5024** (0.0237)	0.4940** (0.0214)	0.4645** (0.0211)	0.5111** (0.0222)	0.4973** (0.0238)	0.5137** (0.0224)	0.5102** (0.0219)	0.4884** (0.0234)	0.5245** (0.0217)	0.4530** (0.0210)	0.5244** (0.0216)	0.5156** (0.0209)	0.5079** (0.0215)
	$\hat{\gamma}_2$	-0.1655** (0.0143)	-0.1921** (0.0260)	-0.1561** (0.0125)	-0.1420** (0.0131)	-0.1512** (0.0163)	-0.1441** (0.0133)	-0.1183** (0.0140)	-0.1546** (0.0137)	-0.1523** (0.0173)	-0.1656** (0.0150)	-0.1600** (0.0142)	-0.1338** (0.0166)	-0.1894** (0.0156)	-0.1106** (0.0138)	-0.1595** (0.0132)	-0.1572** (0.0126)	-0.1491** (0.0134)
	$\hat{\gamma}_3$		0.7492** (0.0342)															
	$\hat{\gamma}_4$	1279.22** (222.674)	271.517** (90.006)	2530.92** (431.619)	457.388** (179.108)	-63.004 (407.467)	1795.47** (518.672)	5955.61** (846.981)	385.355 (356.96)	595.677 (446.99)	972.59** (239.678)	1863.87** (361.017)	1087.18 (142.512)	1719.08** (159.531)	1119.53** (100.553)	5638.31** (700.670)	1082.79** (358.93)	266.22** (73.3573)

* Denotes significance at the 10% level.
** Denotes significance at the 5% level.

9. SriLanka

Table 5.31 emphasis on the asymmetric impact of shock on volatility of SriLanka Islamic stock returns. The results suggest that there is positive significant mean spillover from SriLankan Islamic stock market to all countries. However, our empirical result does not supports mean spillover effect from UK and Bahrain. The leverage effects $\hat{\gamma}_2$ are negatively significant for all countries at 5% level, which shows that good news generates less volatility than bad news. It indicates that negative shocks have a greater influence on volatility relative to the positive shocks of the same magnitude and indicates that if the risk of a business goes up the investor will shift their funds to less risky investment. There is positive variance spillover for Canada, China, India, Indonesia, Kuwait, and UK Islamic stocks. However, Islamic stocks of other countries in the study show no significant impact on volatility of SriLanka Islamic stocks returns. Indonesia, Japan, Kuwait US, UK, KSA, Taiwan, Thailand, and Bahrain, Islamic stocks returns have changed patterns of integration at variance level as we applied EGARCH in asymmetric analysis.

10. Turkey

Identifying the asymmetric impact of shocking on volatility of Turkish with other countries in Table 5.32. The results indicate that the mean spillover effect from Turkish Islamic stock returns positively significant for all countries expect Bahrain. The leverage effects $\hat{\gamma}_2$ are negative at 5% significant level which specify that good news causes less volatility than bad news. It denotes that negative shocks have a greater impact on volatility comparative to the positive shocks of the same magnitude and shows that if the risk of a business increase the investor will move their funds to less risky investment. In addition, there is positive variance spillover for China, Indonesia, Japan, Malaysia, UK, Bahrain and US Islamic stocks. However, Islamic stocks of other countries in the study show no significant impact on volatility of Turkish

Islamic stocks returns. After application of EGARCH for identifying asymmetric impact of Turkish Islamic stocks returns, Canada, UK, US, Dubai Islamic stocks returns have change in the patterns of integration at variance level.

Table 5.31: Empirical Results of Asymmetric Analysis of SriLanka with Other Countries

		Canada	China	India	Indonesia	Japan	Kuwait	Malaysia	Pakistan	Turkey	UK	US	Qatar	KSA	Dubai	Taiwan	Thailand	Bahrain
ARMA(p,q)		(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	([2],0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)
GARCH(p,q)		(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)
Parameter		Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)
Mean eq	$\hat{\beta}_0$	0.0002 (0.0002)	0.0001 (0.0002)	7.41E-05 (0.0002)	6.67E-05 (0.0002)	0.0001 (0.0002)	0.0001 (0.0002)	0.0001 (0.0002)	7.83E-05 (0.0002)	9.18E-05 (0.0002)	0.0001 (0.0002)	0.0001 (0.0002)	7.66E-05 (0.0002)	3.99E-05 (0.0002)	5.54E-06 (0.0002)	0.0001 (0.0002)	7.17E-05 (0.00196)	0.0001 (0.0002)
	$\hat{\beta}_1$	0.0197** (0.0148)	0.0510** (0.0193)	0.0406** (0.0146)	0.0441** (0.0141)	-0.0140** (0.0169)	0.0329** (0.0250)	0.0888** (0.0221)	0.0516** (0.0173)	0.0227** (0.0153)	0.0015 (0.0154)	-0.0367* (0.0203)	0.0303** (0.0143)	0.0307** (0.0137)	0.0535** (0.0154)	0.0351* (0.0198)	0.0551** (0.0147)	0.0159 (0.0150)
	$\hat{\beta}_2$	0.1338** (0.0277)	0.1368** (0.0275)	0.1401** (0.0275)	0.1364** (0.0274)	0.1325** (0.0276)	0.1311** (0.0276)	0.1214** (0.0273)	0.1247** (0.0273)	0.1352** (0.0273)	0.1310** (0.0276)	0.1284** (0.0272)	0.0648** (0.0279)	0.1408** (0.0275)	0.1259** (0.0273)	0.1310** (0.0277)	0.1407** (0.0274)	0.1308** (0.0273)
Variance eq	$\hat{\gamma}_0$	-0.8866** (0.1189)	-0.8044** (0.1051)	-0.8099** (0.1131)	0.2776** (0.0222)	-0.7540** ()0.0991	0.0001** (0.0002)	-0.7719** (0.1001)	-0.7733** (0.0980)	-0.7466** (0.0957)	-0.8308** (0.1133)	-0.7966** (0.1014)	-0.7830** (0.0999)	-0.7771** (0.0971)	-0.7268** (0.0953)	-0.7533** (0.1084)	-0.7913** (0.1011)	-0.7662** (0.0969)
	$\hat{\gamma}_1$	0.2514** (0.0228)	0.2642** (0.0225)	0.2711** (0.0228)	-0.0732** (0.0117)	0.2740** (0.0229)	-0.7754** (0.0968)	0.2768** (0.0227)	0.2734** (0.0222)	0.2703** (0.0223)	0.2645** (0.0227)	0.2728** (0.0221)	0.2735** (0.0221)	0.2716** (0.0223)	0.2671** (0.0224)	0.2680** (0.0224)	0.2677** (0.0230)	0.2712** (0.222)
	$\hat{\gamma}_2$	-0.0572** (0.0113)	-0.0636* (0.0120)	-0.0659 (0.0122)	0.9437 (0.0089)	-0.071014 (0.0114)	0.2717** (0.0217)	-0.0715** (0.0122)	-0.0692** (0.0113)	-0.0700** (0.0111)	-0.0632** (0.0119)	-0.0674** (0.0116)	-0.0647** (0.0104)	-0.0689** (0.0112)	-0.0655** (0.0113)	-0.0678** (0.0118)	-0.0673** (0.0117)	-0.0693** (0.0111)
	$\hat{\gamma}_3$	0.9291** (0.0111)	0.9365** (0.0100)	0.9366** (0.0104)	-62.055** (38.677)	0.9403** (0.0095)	-0.0678** (0.0112)	0.9393** (0.0095)	0.9389** (0.0095)	0.9407** (0.0092)	0.9338** (0.0107)	0.9371** (0.0097)	0.9372** (0.0098)	0.9386** (0.0094)	0.9431** (0.0092)	0.9411** (0.0101)	0.9378** (0.0096)	0.9401** (0.0093)
	$\hat{\gamma}_4$	182.506** (47.733)	131.13** (74.117)	95.413** (85.428)	0.2776** (0.0222)	-58.41233 (40.4274)	0.9391 (0.0093)	-31.3296 (132.253)	-4.7197 (21.073)	-57.915 (72.064)	92.915* (51.5598)	67.823 (63.176)	-39.477 (25.532)	16.077 (31.389)	-17.290 (19.568)	40.120 (147.41)	74.05 (053.968)	23.120 (20.079)

* Denotes significance at the 10% level.
** Denotes significance at the 5% level.

Table 5.32: Empirical Results of Asymmetric Analysis of Turkey with Other Countries

		Canada	China	India	Indonesia	Japan	Kuwait	Malaysia	Pakistan	Sri-Lanka	UK	US	Qatar	KSA	Dubai	Taiwan	Thailand	Bahrain
ARMA(p,q)		(1,1)	([2],[2])	([5],[5])	([2],[2])	([3],[3])	(0,0)	(0,0)	([3],[3])	([6],[6])	(1,1)	(1,1)	(1,1)	(1,1)	(0,0)	([2],[2])	(0,0)	([3],0)
GARCH(p,q)		(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)
Parameter		Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)
Mean eq	$\hat{\beta}_0$	0.0002 (0.0002)	7.32E-05 (0.0002)	0.0002 (0.0003)	0.0001 (0.0002)	-2.56E-05 (9.67E-05)	0.0002 (0.0003)	0.0001 (0.0003)	-2.11E-05 (9.21E-05)	0.0003 (0.0004)	9.51E-05 (0.0002)	-4.60E-05 (0.0001)	-2.52E-05** (9.15E-05)	0.0001 (0.0002)	0.0001 (0.0003)	7.78E-05 (0.0002)	0.0001 (0.0002)	0.0002 (0.0003)
	$\hat{\beta}_1$	0.2103** (0.0160)	0.2839** (0.0240)	0.2288** (0.0178)	0.2024** (0.0192)	0.0732** (0.0193)	0.1812** (0.0410)	0.3191** (0.0254)	0.0587** (0.0187)	0.0530** (0.0204)	0.3168** (0.0161)	0.3178** (0.0217)	0.0666** (0.0205)	0.1677** (0.0227)	0.1097** (0.0217)	0.2406** (0.0255)	0.2163** (0.0218)	0.0401** (0.0155)
	$\hat{\beta}_2$	0.3707** (0.0680)	0.1813** ()0.0925	-0.1735** (0.0837)	0.2026** (0.0908)	0.6757** (0.0732)			0.7026** (0.0763)	-0.6733** (0.1043)	0.2567** (0.0545)	0.4973** (0.0500)	0.7022** (0.1124)	0.3261** (0.1095)		0.2787** (0.1004)		0.0544** (0.0273)
	$\hat{\beta}_3$	-0.3978** (0.0730)	-0.1906** (0.0950)	0.1975** (0.0868)	-0.1982** (0.0901)	-0.6528** (0.0760)			-0.6813** (0.0778)	0.6663** (0.1062)	-0.2921** (0.0626)	-0.5253** (0.0564)	-0.6805** (0.1196)	-0.3171** (0.1130)		-0.2799** (0.1012)		
Variance eq	$\hat{\gamma}_0$	-1.0293** (0.1450)	-1.1852** (0.1512)	-1.2111** (0.1751)	-1.4525** (0.2119)	-1.2596** (0.1547)	-1.0351** (0.1304)	-1.0564** (0.1463)	-1.0681** (0.1345)	-0.9472** (0.1175)	-1.0016** (0.1339)	-0.8593** (0.1333)	-0.9307** (0.1226)	-0.8970** (0.1212)	-0.9520** (0.1215)	-1.1654** (0.1436)	-1.0721* (0.1624)	-1.2265** (0.1619)
	$\hat{\gamma}_1$	0.1388** (0.0217)	0.1386** (0.0241)	0.1388** (0.0240)	0.1620** (0.0232)	0.1342** (0.0242)	0.1595** (0.0200)	0.1300** (0.0212)	0.1579** (0.0214)	0.1623** (0.0197)	0.1259** (0.0218)	0.1338** (0.0211)	0.1385** (0.0190)	0.1366** (0.0182)	0.1434** (0.0193)	0.1620** (0.0222)	0.1412** (0.0225)	0.1531** (0.0211)
	$\hat{\gamma}_2$	-0.1158** (0.0116)	-0.1403** (0.0115)	-0.1264** (0.0118)	-0.1445** (0.0132)	-0.1518** (0.0120)	-0.1152** (0.0102)	-0.1080** (0.0113)	-0.1314** (0.0109)	-0.1139** (0.0102)	-0.1076** (0.0129)	-0.1115** (0.0115)	-0.9083** (0.01287	-0.1132** (0.0106)	-0.1125** (0.0102)	-0.1257** (0.0118)	-0.1164** (0.0105)	-0.1310** (0.0115)
	$\hat{\gamma}_3$	0.8976** (0.0153)	0.8833** (0.0153)	0.8792** (0.0179)	0.8562** (0.0219)	0.8755** (0.0159)	0.8990** (0.0135)	0.8970** (0.0151)	0.8947** (0.0141)	0.9083** (0.0123)	0.9024** (0.0137)	0.9170** (0.0136)	0.9083** (0.0128)	0.9119** (0.0126)	0.9060** (0.0127)	0.8871** (0.0146)	0.8942** (0.0166)	0.8788** (0.0168)
	$\hat{\gamma}_4$	-45.1497 (42.5924)	179.931** (87.8178)	37.4505 (84.1770)	119.95* (71.1578)	261.821** (61.075)	71.078 (101.739)	312.042** (134.591)	-5.4922 (30.393)	-15.024 (62.507)	69.155** (23.360)	10.598** (58.294)	-3.3583 (25.302)	-23.930 (31.1336)	-28.229 (27.3932)	177.890 (135.298)	38.181 (68.9891)	70.411** (25.1988)

* Denotes significance at the 10% level.
** Denotes significance at the 5% level.

11. United Kingdom(UK)

The Asymmetric Analysis of UK with Other Countries in Table 5.33 show empirical results, there is positive significant mean spillover from UK Islamic stock market to all countries. The leverage effects $\hat{\gamma}_2$ are almost negative at 5% significant level which means that good news generates less volatility than bad news. It implies that negative shocks have a greater influence on volatility relative to the positive shocks of the same magnitude and indicates that if the risk of a business rise the investor will shift their funds to less risky investment. In addition, there is positive variance spillover Canada, China, SriLanka, US, KSA, Taiwan and Thailand Islamic stocks. However, Islamic stocks of other countries in the study show no significant impact on volatility of UK Islamic stocks returns. With the application of EGARCH for identifying asymmetric impact of UK Islamic stock, the Islamic stocks of India, Kuwait, Malaysia, Pakistan, Dubai, Bahrain have change in the patterns of integration at variance level.

12. United States(US)

The US asymmetric analysis with other countries indicate that there is positive significant mean spillover from US Islamic stock market to all countries. The leverage effects $\hat{\gamma}_2$ are negative at 5% significant level which shows that good news creates less volatility than bad news. It implies that negative shocks have a greater impact on volatility relative to the positive shocks of the same degree and indicates that if the risk of a business goes up the investor will transfer their funds to less risky investment. There is positive variance spillover Canada, China, Indonesia, Malaysia, SriLanka, UK, Taiwan and Thailand Islamic stocks. However, Islamic stocks of other countries in the study show no significant impact on volatility of US Islamic stocks returns. EGARCH is applied for identifying asymmetric impact of US Islamic stock returns, the Islamic stocks of India, Kuwait, and KSA, showed change in their behavior of integration at variance level.

Table 5.33: Empirical Results of Asymmetric Analysis of UK with Other Countries

		Canada	China	India	Indonesia	Japan	Kuwait	Malaysia	Pakistan	Sri-Lanka	Turkey	US	Qatar	KSA	Dubai	Taiwan	Thailand	Bahrain
ARMA(p,q)		(0,1)	(1,0)	(0,0)	(0,0)	(1,1)	(0,0)	(0,0)	(0,0)	([2],[2])	(0,[4])	(0,0)	(1,0)	([4],0)	(0,[4])	(1,0)	(1,1)	([4],[4])
GARCH(p,q)		(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)
Parameter		Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)
Mean eq	$\hat{\beta}_0$	6.47E-05 (0.0002)	-0.0004* (0.0002)	-0.0005* (0.0002)	-0.0004* (0.0003)	-0.0003* (0.0002)	-0.0004 (0.0003)	-0.0004 (0.0003)	-0.0005* (0.0003)	-9.11E-05 (9.38E-05)	-0.0003 (0.0002)	-0.0004** (0.0002)	-0.0005** (0.0003)	-0.0004* (0.0003)	-0.0004* (0.0002)	-0.0003* (0.0001)	-0.0004 (0.00031)	-0.0001** (0.0001)
	$\hat{\beta}_1$	0.5856** (0.0143)	0.5328** (0.0231)	0.2663** (0.0160)	0.1587** (0.0166)	0.2531** (0.0186)	0.1602** (0.0373)	0.3103** (0.0264)	0.0705** (0.0194)	0.0272** (0.0137)	0.2834** (0.0157)	0.8959** (0.0216)	0.0801** (0.0219)	0.2322** (0.0183)	0.1236** (0.0196)	0.2955** (0.0253)	0.2507** (0.0215)	0.0160* (0.0097)
	$\hat{\beta}_2$	-0.1675** (0.0267)	-0.1044** (0.0257)			0.3103** (0.0654)				0.7677** (0.1481)	-0.0479* (0.0261)		0.0463* (0.0275)	-0.0415* (0.0241)	-0.0489** (0.0243)	0.3844** (0.0644)	-0.1833** (0.0807)	0.6113** (0.2072)
	$\hat{\beta}_3$					-0.3547** (0.0715)				-0.7885** (0.1418)						-0.4454** (0.0652)	0.1868** (0.0842)	-0.6478** (0.2024)
Variance eq	$\hat{\gamma}_0$	-0.7582** (0.2046)	-0.6420** (0.1400)	-0.2212** (0.0462)	-0.2256** (0.0359)	-0.2022** (0.0323)	-0.2307** (0.0331)	-0.3156** (0.0557)	-0.1843** (0.0269)	-0.2767** (0.0427)	-0.3062** (0.0524)	-10.0424** (0.0606)	-0.2228** (0.0339)	-0.1730** (0.0278)	-0.2242** (0.0343)	-0.4027** (0.0894)	-0.3426** (0.0546)	-0.1958** (0.0294)
	$\hat{\gamma}_1$	0.1740** (0.0229)	0.1266** (0.0211)	0.1086** (0.0132)	0.0825** (0.0099)	0.0788** (0.0106)	0.0896** (0.0097)	0.0940** (0.0096)	0.0715** (0.0086)	0.0856** (0.0105)	0.1285** (0.0134)	0.2804** (0.0340)	0.0838** (0.0091)	0.0783** (0.0096)	0.0868** (0.0105)	0.1001** (0.0157)	0.1027** (0.0120)	0.0806** (0.0090)
	$\hat{\gamma}_2$	-0.0723** (0.0157)	-0.1548** (0.0173)	-0.1167** (0.0139)	-0.1282** (0.0140)	-0.1123** (0.0127)	-0.1305** (0.0140)	-0.1326** (0.0152)	-0.1225** (0.0122)	-0.1337** (0.0142)	-0.1047** (0.0143)	-0.0559** (0.0218)	-0.1359** (0.0147)	-0.1171** (0.0133)	-0.1277** (0.0137)	-0.1363** (0.0164)	-0.1341** (0.0161)	-0.1166** (0.0125)
	$\hat{\gamma}_3$	0.9363* (0.0192)	0.9437** (0.0130)	0.9839** (0.0043)	0.9817** (0.0037)	0.9843** (0.0033)	0.9818** (0.0034)	0.9735** (0.0056)	0.9853** (0.0028)	0.9772** (0.0041)	0.9778** (0.0053)		0.9817** (0.0036)	0.9873** (0.0028)	0.9821** (0.0035)	0.9665** (0.0080)	0.9717** (0.0054)	0.9846** (0.0031)
	$\hat{\gamma}_4$	126.91* (65.72)	277.38** (100.15)	-33.394 (32.835)	-3.6413 (13.7620)	18.1426 (21.1446)	20.590 (51.242)	94.107 (86.528)	-6.9458 (7.1956)	80.538** (30.625)	49.889 (42.4132)	4580.74** (419.045)	-15.304 (12.970)	1.3367** (13.613)	-12.417 (14.160)	236.38** (112.144)	61.768** (29.130)	-7.7119 (9.3448)

* Denotes significance at the 10% level.
** Denotes significance at the 5% level.

Table 5.34: Empirical Results of Asymmetric Analysis of US with Other Countries

		Canada	China	India	Indonesia	Japan	Kuwait	Malaysia	Pakistan	Sri-Lanka	Turkey	UK	Qatar	KSA	Dubai	Taiwan	Thailand	Bahrain
ARMA(p,q)		(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	([5],0)	(1,0)	([5],0)	([5],0)	([5],0)	(1,0)	([5],0)	([3],0)	([5],0)	(1,0)	(1,0)	([5],0)
GARCH(p,q)		(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(2,1)	(1,1)	(0,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)
Parameter		Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)
Mean eq	$\hat{\beta}_0$	0.0004** (0.0002)	0.0002 (0.0002)	0.0002 (0.0002)	0.0002 (0.0002)	6.55E-05 (0.0002)	0.0002 (0.0002)	0.0002 (0.0002)	0.0002 (0.0002)	0.0002 (0.0002)	0.0001 (0.0001)	0.0003** (0.0002)	0.0002 (0.0002)	0.0002 (0.0002)	0.0002 (0.0002)	7.30E-05 (0.0002)	0.0001 (0.0002)	0.0002 (0.0002)
	$\hat{\beta}_1$	0.3930** (0.0118)	0.3193** (0.0185)	0.1561** (0.0127)	0.0925** (0.0141)	0.1449** (0.0127)	0.0804** (0.0257)	0.176** (0.0198)	-0.0009** (0.0155)	-0.0197 (0.0157)	0.1341** (0.0125)	0.4973** (0.0122)	0.0585** (0.0166)	0.1062** (0.0149)	0.0635** (0.0155)	0.1915** (0.0187)	0.1570** (0.041))	0.0241** (0.0117)
	$\hat{\beta}_2$	-03055** (0.0193)	-0.1633** (0.0245)	-0.0771** (0.0251)	-0.0501* (0.0260)	-0.0517** (0.0249)	-0.0452** (0.0211)	-0.0701** (0.0262)	-0.0429** (0.0211)	-0.0419* (0.0215)	-0.0499** (0.0214)	-0.1112** (0.0210)	-0.0493** (0.0212)	-0.0461* (0.0262)	-0.0446** (0.0215)	-0.0561** (0.0245)	-0.0516** (0.0244)	-0.0442** (0.0212)
Variance eq	$\hat{\gamma}_0$	-1.2277** (0.2260)	-1.0493** (0.1495)	-0.7007** (0.0926)	-0.6687** (0.0763)	-0.5088** (0.0703)	-0.6059** (0.0752)	-0.7796** (0.0852)	-0.5989** (0.0771)	-0.6809** (0.0845)	-0.6630** (0.0925)	-10.814** (0.0676)	-0.6309** (0.0819)	-0.5437** (0.0709)	-0.5833** (0.0781)	-0.8383** (0.1403)	-0.7669** (0.0716)	-0.6228** (0.0795)
	$\hat{\gamma}_1$	0.1135** (0.0293)	0.0553** (0.0242)	0.1486** (0.0243)	0.0764** (0.0220)	0.1055** (0.0179)	0.1103** (0.0181)	0.0665** (0.0209)	0.1114** (0.0183)	0.1068** (0.0193)	0.1272** (0.0225)	0.3594** (0.0505)	0.1194** (0.0202)	0.1197** (0.0182)	0.1134** (0.0190)	0.0839** (0.0221)	0.0271** (0.0200)	0.1157** (0.0191)
	$\hat{\gamma}_2$	-0.1732** (0.0196)	-0.2539** (0.0216)	-0.2262** (0.0196)	-0.2457** (0.0183)	-0.2272** (0.0171)	-0.2371** (0.0183)	-0.2692** (0.0188)	-0.2341** (0.0177)	-0.2444** (0.0179)	-0.2168** (0.0184)	-0.1106** (0.0339)	-0.2347** (0.0191)	-0.2097** (0.0178)	-0.2329** (0.0182)	-0.2466** (0.0205)	-0.2841** (0.0199)	-0.2351** (0.0180)
	$\hat{\gamma}_3$	0.8905** (0.0208)	0.9029** (0.0143)	0.9408** (0.0086)	0.9386** (0.0074)	0.9555** (0.0066)	0.9459** (0.0072)	0.9295** (0.0080)	0.9460** (0.0074)	0.9389** (0.0081)	0.9425** (0.0085)		0.9435** (0.0078)	0.9530** (0.0068)	0.9480** (0.0074)	0.9257** (0.0126)	0.9270** (0.0071)	0.9443** (0.0076)
	$\hat{\gamma}_4$	213.763** (63.578)	563.42** (117.824)	90.465 (66.409)	107.88** (26.1952)	17.1679 (37.778)	59.667 (96.2683)	652.626** (125.116)	-28.56 (18.435)	129.29** (43.805)	98.561 ()64.273	3000.8** (283.62)	-20.5792 (1.6122)	3.7381 (26.724)	-21.262 (26.615)	567.66** (185.63)	304.59** (42.496)	5.6520 (16.350)

* Denotes significance at the 10% level.
** Denotes significance at the 5% level.

13. Qatar

Focusing on the asymmetric impact of shocking on volatility, the analysis of Qatar with other countries. Table 5.35 show empirical results, imply that there is positive significant mean spillover from Qatar Islamic stock market to all countries. The leverage effects $\hat{\gamma}_2$ are almost negative at 5% significant level which means that good news generates less volatility than bad news. It implies that negative shocks have a greater influence on volatility relative to the positive shocks of the same magnitude and indicates that if the risk of a business goes up the investor will shift their funds to less risky investment. In addition, there is positive variance spillover with KSA and Bahrain. And negative variance spillover for all countries. However our empirical result doesn't supports variance spillover effect from Kuwait, and Dubai Islamic stocks returns. With the application of EGARCH for identifying asymmetric impact of Qatar Islamic stock, Pakistan, turkey, Dubai, Islamic stocks have noted change in the patterns of integration at variance level returns.

14. Kingdom of Saudi Arabia(KSA)

The asymmetric effect of shocks on volatility of KSA Islamic stock with other countries. The results indicate that there is positive significant mean spillover from KSA market to all countries. Our empirical result does not supports mean spillover effect from Pakistan. The leverage effects $\hat{\gamma}_2$ are almost negative at 5% significant level which shows that good news generates less volatility than bad news. It denotes that negative shocks have a greater influence on volatility relative to the positive shocks of the same scale and indicates that if the risk of a business goes up the investor will shift their funds to less risky investment. In addition, there is positive variance spillover for Kuwait, SriLanka, Turkey, Qatar, and Dubai and there is negative variance spillover for Canada, China, India, Indonesia, Japan, UK, Bahrain and Taiwan. However our empirical result doesn't supports variance spillover effect from other

countries in the study. With the application of EGARCH for identifying asymmetric impact of KSA Islamic stock the Islamic stocks of China, Japan, Malaysian, Pakistan, SriLanka, and Dubai, change in the patterns of integration at variance level.

Table 5.35: Empirical Results of Asymmetric Analysis of Qatar with Other Countries

		Canada	China	India	Indonesia	Japan	Kuwait	Malaysia	Pakistan	Sri-Lanka	Turkey	UK	US	KSA	Dubai	Taiwan	Thailand	Bahrain
ARMA(p,q)		(0,0)	(0,0)	(0,0)	(0,0)	(0,0)	(0,0)	(0,0)	(0,0)	(0,0)	(0,0)	(0,0)	(0,0)	(0,0)	(0,0)	(0,0)	(0,0)	(0,0)
GARCH(p,q)		(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(0,1)	(1,1)	(1,1)	(1,1)	(1,1)
Parameter		Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)
Mean eq	$\hat{\beta}_0$	0.0006** (0.0002)	0.0006** (0.00051)	0.0007** (0.0002)	0.0006** (0.0002)	0.0007** (0.0001)	0.0007** (0.0001)	0.0006** (0.0001)	0.0007** (0.0001)	0.00073** (0.0001)	0.0007** (0.0001)	0.0006** (0.0002)	0.0006** (0.0002)	0.0008** (0.0002)	0.0006** (0.0002)	0.0007** (0.0002)	0.0006** (0.0002)	0.0007** (0.0002)
	$\hat{\beta}_1$	0.0897** (0.0099)	0.1038** (0.0151)	0.0220* (0.0120)	0.0734** (0.0113)	0.0521** (0.0119)	0.0732** (0.0276)	0.0849** (0.0172)	0.0258* (0.0141)	0.0296** (0.0145)	0.0198** (0.0103)	0.0894** (0.0112)	0.1366** (0.0131)	0.2442** (0.0156)	0.1441** (0.0170)	0.0244** (0.0120)	0.0527** (0.0134)	0.0392** (0.1034)
Variance eq	$\hat{\gamma}_0$	-0.5981** (0.0630)	-0.5846** (0.0616)	-0.4786** (0.0531)	-0.5435** (0.05715)	-0.4988** (0.0538)	-0.5746** (0.06153)	-0.4823** (0.0514)	-0.5579** (0.0589)	-0.5852** (0.0623)	-0.5348** (0.0575)	-0.5961** (0.0624)	-0.6179** (0.0663)	-10.311** (0.0364)	-0.4753** (0.0789)	-0.5227** (0.0564)	-0.5117** (0.0561)	-0.6701** (0.0690)
	$\hat{\gamma}_1$	0.3014** (0.0157)	0.2842** (0.01388)	0.2650** (0.0141)	0.2879** (0.0142)	0.2767** (0.0132)	0.2913** (0.0140)	0.2811** (0.0133)	0.2795** (0.0133)	0.2832** (0.0145)	0.2799** (0.0139)	0.2974** (0.0145)	0.3241** (0.01749)	0.5245** (0.0336)	0.2814** (0.0135)	0.2757** (0.0132)	0.2726** (0.0144)	0.3180** (0.1835)
	$\hat{\gamma}_2$	-0.0978** (0.0104)	-0.0990** (0.0102)	-0.0908** (0.0097)	-0.0917** (0.0103)	-0.0810** (0.01012)	-0.0931** (0.0103)	-0.0978** (0.0098)	-0.0902** (0.0101)	-0.0894** (0.0102)	-0.0909** (0.0100)	-0.0923** (0.0106)	-0.0938** (0.01100)	-0.1829** (0.0260)	-0.0952** (0.0108)	-0.0924** (0.0099)	-0.0940** (0.01005)	-0.0919** (0.0111)
	$\hat{\gamma}_3$	0.9581** (0.0061)	0.9585** (0.0061)	0.9654** (0.00514)	0.9624** (0.0056)	0.9669** (0.00510)	0.9613** (0.0060)	0.9672** (0.00509)	0.9620** (0.0057)	0.9587** (0.0061)	0.9629** (0.0055)	0.9583** (0.0062)	0.9586** (0.0063)		0.9706** (0.0076)	0.9620** (0.0055)	0.9645** (0.0055)	0.9550** (0.0064)
	$\hat{\gamma}_4$	-95.784** (29.913)	-149.28** (56.622)	-256.87** (42.660)	-129.43** (36.289)	-113.87** (37.023)	-67.90715 (118.93)	-431.90** (101.20)	-34.913* (19.626)	-115.32** (46.677)	-151.00** (57.647)	-103.33** (33.11210)	-128.2** (68.482)	3183.571** (198.34)	-63.973 (49.660)	-371.39** (106.7)	-170.14** (48.793)	48.557** (14.335)

* Denotes significance at the 10% level.
** Denotes significance at the 5% level.

Table 5.36: Empirical Results of Asymmetric Analysis of KSA with Other Countries

		Canada	China	India	Indonesia	Japan	Kuwait	Malaysia	Pakistan	Sri-Lanka	Turkey	UK	US	Qatar	Dubai	Taiwan	Thailand	Bahrain
ARMA(p,q)		(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)
GARCH(p,q)		(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)
Parameter		Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)
Mean eq	$\hat{\beta}_0$	0.0002 (0.0002)	0.0003 (0.0002)	0.0002 (0.0002)	0.0003 (0.0002)	0.0002 (0.0002)	0.0003 (0.0002)	0.0002 (0.0002)	0.0005** (0.0002)	0.0004** (0.0002)	0.0003 (0.0002)	0.0001 (0.0002)	0.0001 (0.0002)	-0.0001** (0.0002)	0.0003 (0.0002)	0.0002 (0.0002)	0.0002 (0.0002)	0.0004* (0.0002)
	$\hat{\beta}_1$	0.1193** (0.0112)	0.2033** (0.0175)	0.0968** (0.0130	0.0898** (0.0125)	0.1050** (0.0165)	0.1953** (0.0353)	0.1667** (0.0211)	-0.0079 (0.0128)	0.0311* (0.0187)	0.0605** (0.0136)	0.1488** (0.0132)	0.1734** (0.0166)	0.1599** (0.0195)	0.1258** (0.0197)	0.1289** (0.0193)	0.0978** (0.0151)	-0.0271** (0.0138)
	$\hat{\beta}_2$	0.1061** (0.0284)	0.1006** (0.0268)	0.1076** (0.0280)	0.1335** (0.0296)	0.1313** (0.0287)	0.1144** (0.0268)	0.1188** (0.0284)	0.1322** (0.0282)	0.1216** (0.0278)	0.1355** (0.0284)	0.1145** (0.0277)	0.1132** (0.0272)	0.1294** (0.0274)	0.1090** (0.0283)	0.1262** (0.0269)	0.1180** (0.0299)	0.1307** (0.0272)
Variance eq	$\hat{\gamma}_0$	-0.6872** (0.0444)	-0.6410** (0.0410)	-0.6759** (0.0409)	-0.7011** (0.0526)	-0.6655** (0.0450)	-0.8155** (0.0493)	-0.7074** (0.0494)	-0.7437** (0.0419)	-0.7099** (0.0405)	-0.7585** (0.0432)	-0.6310** (0.0406)	-0.6193** (0.0432)	-0.8302** (0.0597)	-0.7483** (0.0472)	-0.6002** (0.0459)	-0.7265** (0.0468)	-0.8467** (0.0495)
	$\hat{\gamma}_1$	0.2057** (0.0159)	0.1993** (0.0121)	0.1881** (0.0138)	0.1722** (0.0129)	0.1772** (0.0127)	0.1519** (0.0131)	0.1698** (0.0163)	0.1623** (0.0113)	0.1524** (0.0134)	0.1654** (0.0123)	0.1865** (0.0124)	0.1935** (0.0145)	0.1540** (0.0114)	0.1501** (0.0122)	0.1763** (0.0117)	0.1830** (0.0160)	0.1938** (0.0168)
	$\hat{\gamma}_2$	-0.1513** (0.0125)	-0.1704** (0.0109)	-0.1549** (0.0101)	-0.1601** (0.0112)	-0.1705** (0.0114)	-0.1924** (0.0124)	-0.1723** (0.0114)	-0.1869** (0.0118)	-0.1864** (0.0110)	-0.1761** (0.0119)	-0.1502** (0.0114)	-0.1540** (0.0100)	-0.1783** (0.0133)	-0.1795** (0.0113)	-0.1751** (0.0109)	-0.1610** (0.0105)	-0.1953** (0.0119)
	$\hat{\gamma}_3$	0.9400** (0.0047)	0.9448** (0.0045)	0.9380** (0.0042)	0.9378** (0.0056)	0.9420** (0.0048)	0.9262** (0.0050)	0.9366** (0.0049)	0.9339** (0.0045)	0.9374** (0.0042)	0.9337** (0.0044)	0.9445** (0.0044)	0.9468** (0.0044)	0.9244** (0.0062)	0.9329** (0.0050)	0.9447** (0.0047)	0.9355** (0.0050)	0.9276** (0.0046)
	$\hat{\gamma}_4$	-114.71** (40.139)	-242.92** (56.003)	-241.01** (60.61)	-36.631** (28.479)	-45.057** (36.788)	222.86** (87.387)	-136.5118 (107.18)	17.108 (12.532)	85.72*** (29.381)	123.48** (21.810)	-141.76** (31.699)	-192.09** (42.745)	101.31** (29.346)	49.874** (25.36)	-470.12** (97.354)	-65.141 (46.593)	100.60** (11.4416)

* Denotes significance at the 10% level.
** Denotes significance at the 5% level.

15. Dubai

Table 5.37 shows the asymmetric impact of shocking on volatility Dubai's Islamic stock returns. The results imply that there is positive significant mean spillover from Dubai Islamic stock market to all countries. However, our empirical result doesn't supports mean spillover effect from Qatar. The leverage effects $\hat{\gamma}_2$ are negative at 5% significant level for all countries which means that good news generates less volatility than bad news. It suggests that negative shocks have a greater influence on volatility relative to the positive shocks of the same magnitude and indicates that if the risk of a business goes up the investor will shift their funds to less risky investment. There is positive variance spillover for Kuwait and KSA and there is negative variance spillover for other countries, expect from Thailand. When EGARCH is applied on Dubai Islamic stock returns, Canada, japan, Pakistan, SriLanka, turkey, US, Bahrain, Islamic stocks returns change the patterns of integration at variance level.

16. Taiwan

The asymmetric impact of shock on volatility of Taiwan Islamic stocks. The results indicate that there is positive significant mean spillover from Taiwan Islamic stock market to all countries expect for Bahrain SriLanka and Qatar. The leverage effects $\hat{\gamma}_2$ are almost negative at 5% significant level which means that good news generates less volatility than bad news. It implies that negative shocks have a greater influence on volatility relative to the positive shocks of the same magnitude and indicates that if the risk of a business goes up the investor will shift their funds to less risky investment. In addition, there is positive variance spillover for Canada, India, Indonesia, Malaysia, and Turkey and there is negative variance spillover Pakistan and Bahrain. EGARCH is applied for identifying its asymmetric impact of Taiwan Islamic stocks returns and Indonesia, Kuwait, Malaysia, Pakistan, Turkey, US, Qatar, KSA, Bahrain, Islamic stocks returns. Results can be verified form Table 5.38.

Table 5.37: Empirical Results of Asymmetric Analysis of Dubai with Other Countries

		Canada	China	India	Indonesia	Japan	Kuwait	Malaysia	Pakistan	Sri-Lanka	Turkey	UK	US	Qatar	KSA	Taiwan	Thailand	Bahrain
ARMA(p,q)		(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)	(1,0)		([2],0)	(1,0)	(1,0)	(1,0)
GARCH(p,q)		(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)		(1,1)	(1,1)	(1,1)	(1,1)
Parameter		Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)		Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)
Mean eq	$\hat{\beta}_0$	0.0002 (0.0002)	0.0002 (0.0002)	0.0003 (0.0002)	0.0002 (0.0002)	0.0002 (0.0002)	0.0004* (0.0002)	0.0001 (0.0002)	0.0002 (0.0002)	0.0004** (0.0002)	0.0003 (0.0002)	0.0003* (0.0002)	0.0002 (0.0002)		0.0003 (0.0002)	0.0003 (0.0002)	0.0003 (0.0002)	0.0004** (0.0002)
	$\hat{\beta}_1$	0.0991** (0.0115)	0.2191** (0.0155)	0.1103** (0.0115)	0.1463** (0.0134)	0.1290** (0.0181)	0.3129** (0.0203)	0.2691** (0.0199)	0.1081** (0.0148)	0.0282* (0.0167)	0.0775** (0.0131)	0.1153** (0.0128)	0.1325** (0.0152)		0.2148** (0.0147)	0.0808** (0.0174)	0.1617** (0.0122)	0.0344** (0.0113)
	$\hat{\beta}_2$	0.0785** (0.0270)	0.0960** (0.0283)	0.0815** (0.0263)	0.1004** (0.0274)	0.0862** (0.0258)	0.0774** (0.0291)	0.0816** (0.0280)	0.0756** (0.0281)	0.0876** (0.0875)	0.0822** (0.0290)	0.0924** (0.0285)	0.0815** (0.0280)		0.1075** (0.0255)	0.0954** (0.0281)	0.0804** (0.0270)	0.0865** (0.0287)
Variance eq	$\hat{\gamma}_0$	-0.3340** (0.0348)	-0.3677** (0.0387)	-0.2876** (0.0320)	-0.3607** (0.0351)	-0.2792** (0.0322)	-0.3553** (0.0413)	-0.3434** (0.0383)	-0.3105** (0.0356)	-0.3307** (0.0359)	-0.3442** (0.0365)	-0.3449** (0.0366)	-0.3205** (0.0357)		-0.4996** (0.0569)	-0.3123** (0.0339)	-0.3671** (0.0395)	-0.3444** (0.0349)
	$\hat{\gamma}_1$	0.1819** (0.0136)	0.2111** (0.0155)	0.1772** (0.0132)	0.1948** (0.0141)	0.1821** (0.0130)	0.1695** (0.0136)	0.1987** (0.0147)	0.1775* (0.0127)	0.1648** (0.0127)	0.1834** (0.0133)	0.1802** (0.0134)	0.1829** (0.0140)		0.2004** (0.0173)	0.1807** (0.0135)	0.1989** (0.0148)	0.1822** (0.0130)
	$\hat{\gamma}_2$	-0.1009** (0.0092)	-0.1026** (0.0102)	-0.0927** 0.0088 ()	-0.0932** (0.0094)	-0.0824** (0.0083)	-0.0809** (0.0085)	-0.0852** (0.0102)	-0.0899** (0.0084)	-0.0946** (0.0086)	-0.0888** (0.0084)	-0.0976** (0.0095)	-0.0952** (0.0090)		-0.0683** (0.0120)	-0.0961** (0.0086)	-0.0941** (0.0096)	-0.0909** (0.0083)
	$\hat{\gamma}_3$	0.9761** (0.0035)	0.9745** (0.0041)	0.9781** ()0.0034	0.9744** (0.0037)	0.9816** (0.0032)	0.9748** (0.0042)	0.9769** (0.0038)	0.9786** (0.0035)	0.9752** (0.0038)	0.9762** (0.0037)	0.9751** (0.0037)	0.9779** (0.0036)		0.9624** (0.0055)	0.9758** (0.0036)	0.9749** (0.0038)	0.9765** (0.0035)
	$\hat{\gamma}_4$	-60.552** (15.210)	-171.81** (42.003)	-232.59** (31.726)	-61.759** (21.438)	-111.85** (26.678)	108.534** (51.055)	-112.61* (63.663)	-64.09** (14.116)	-110.67** (24.388)	1.7504 (43.834)	-73.286** (19.158)	-108.72** (34.783)		75.586** (19.170)	-349.96** (69.72)	-25.059 (33.440)	11.477 (9.7019)

* Denotes significance at the 10% level.
** Denotes significance at the 5% level.

Table 5.38: Empirical Results of Asymmetric Analysis of Taiwan with Other Countries

		Canada	China	India	Indonesia	Japan	Kuwait	Malaysia	Pakistan	Sri-Lanka	Turkey	UK	US	Qatar	KSA	Dubai	Thailand	Bahrain
ARMA(p,q)		(0,[2])	(1,0)	(0,[2])	(0,0)	(0,0)	(0,0)	([4],0)	(0,[4])	(0,0)	(0,0)	(0,1)	(0,1)	(0,0)	(0,[4])	(0,0)	(1,0)	(0,0)
GARCH(p,q)		(0,1)	(1,1)	(1,1)	(1,0)	(1,1)	(1,1)	(1,1)	(1,1)	(1,0)	(1,1)	(1,0)	(1,0)	(1,0)	(1,1)	(1,1)	(1,1)	(1,1)
Parameter		Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)
Mean eq	$\hat{\beta}_0$	5.67E-05 (0.0002)	-5.86E-06 (0.0002)	1.17E-05 (0.0002)	-1.53E-05 (0.0002)	-1.76E-05 (0.0002)	7.49E-05 (0.0002)	7.31E-05 (0.0002)	2.03E-05 (0.0002)	6.72E-05 (0.0002)	-3.36E-05 (0.0002)	4.26E-05 (0.0002)	-0.0001 (0.0002)	3.78E-05 (0.0002)	2.55E-05 (0.0002)	7.43E-06 (0.0002)	-3.03E-05 (0.0002)	6.74E-05 (0.0002)
	$\hat{\beta}_1$	0.1482** (0.0170)	0.5003** (0.0187)	0.1771** (0.0162)	0.1749** (0.0180)	0.1344** (0.0180)	0.1114** (0.0330)	0.2523** (0.0263)	0.0569** (0.0191)	0.0229 (0.0192)	0.1616** (0.0210)	0.2248** (0.0186)	0.3110** (0.0252)	0.0345 (0.0221)	0.1104** (0.0182)	0.0762** (0.0196)	0.1714** (0.0199)	0.0073 (0.0164)
	$\hat{\beta}_2$	-0.0552** (0.0274)	-0.1017** (0.0232)	-0.0479* (0.0274)				-0.0467* (0.0265)	-0.0442** (0.0269)			-0.0842** (0.0258)	-0.0911** (0.0270)					
Variance eq	$\hat{\gamma}_0$	-0.3997** (0.0816)	-0.2517** (0.0573)	-0.4247** (0.0785)	-0.2921** (0.0566)	-0.2570** (0.0507)	-0.3136** (0.0539)	-0.3836** (0.0770)	-0.2969** (0.0518)	-0.3388** (0.0501)	-0.3577** (0.0640)	-0.3545** (0.0778)	-0.4665** (0.1123)	-0.2459** (0.0401)	-0.3107** (0.0561)	-0.3051** (0.0550)	-0.4528** (0.0713)	-0.2900** (0.0500)
	$\hat{\gamma}_1$	0.0051 (0.0115)	0.0719** (0.0144)	0.0237* (0.0131)		0.0250** (0.0100)	0.0254** (0.0110)	0.0364** (0.0129)	0.0221** (0.0105)		0.0210** (0.0116)				0.0245** (0.0107)	0.0227** (0.0106)		0.0203** (0.0102)
	$\hat{\gamma}_2$	-0.1169** (0.0148)	-0.0745** (0.0125)	-0.1172** (0.0145)	-0.1080** (0.0110)	-0.1065** (0.0116)	-0.1115** (0.0122)	-0.1089** (0.0141)	-0.1073** (0.0118)	-0.1240** (0.0124)	-0.1141* (0.0132)	-0.1045** (0.0138)	-0.1109** (0.0146)	-0.1112** (0.0105)	-0.1081** (0.0126)	-0.1117** (0.0120)	-0.1275 (0.0139)	-0.1108** (0.0116)
	$\hat{\gamma}_3$	0.9587** (0.0085)	0.9798** (0.0054)	0.9583** (0.0079)	0.9694** (0.0059)	0.9743** (0.0056)	0.9685** (0.0056)	0.9629** (0.0077)	0.9699** (0.0054)	0.9646** (0.0053)	0.9642** (0.0065)	0.9629** (0.0081)	0.9514** (0.0116)	0.9736** (0.0044)	0.9689** (0.0058)	0.9691** (0.0057)	0.9531 (0.007)	0.9705** (0.0052)
	$\hat{\gamma}_4$	51.17** (20.149)	44.537 (41.319)	104.60** (45.007)	30.302** (13.524)	-11.404 (18.177)	22.535 (35.227)	123.65* (68.690)	-3.3862* (8.9437)	79.836** (20.88)	57.611* (31.382)	39.75** (17.903)	110.05** (47.045)	0.4702 (6.131)	16.085 (9.8395)	1.1299 (9.2823)	105.90** 929.183)	-1.7143** (8.1389)

* Denotes significance at the 10% level.
** Denotes significance at the 5% level.

17. Thailand

Focusing on the asymmetric impact of shock on volatility, the bivariate analysis of Thailand with other countries one by one. Table 5.39 in Appendix C show empirical results of the analysis. The results imply that there is positive significant mean spillover from Thailand Islamic stock market to all countries. Our empirical results do not supports mean spillover effect for following countries Bahrain. The leverage effects $\hat{\gamma}_2$ are negative at 5% significant level which means that good news generates less volatility than bad news. It suggests that negative shocks have a greater influence on volatility relative to the positive shocks of the same magnitude and indicates that if the risk of a business goes up the investor will shift their funds to less risky investment. In addition, there is positive variance spillover for Canada, India, Indonesia, Japan, Malaysia, and Turkey and there is negative variance spillover Pakistan. However our empirical result doesn't supports variance spillover effect foe other countries in study. With the application of EGARCH for identifying its asymmetric inpact of domestic country's Islamic stock the Islamic stocks of foreign country, for some countries have noted change in the patterns of integration at variance level of others countries, Islamic stocks returns.

18. Bahrain

Bahrain Islamic stock returns in Table 5.40 show asymmetric impact of shocking on volatility. The results shows that there is positive significant mean spillover from Bahrain Islamic stock market to Indonesia, Japan, Kuwait and Dubai. And negative significant mean spillover effect from UK and Thailand. And results do not supports mean spillover effect for other countries. The leverage effects $\hat{\gamma}_2$ are positive at 5% significant level for all countries which means that good news generates more volatility than bad news. It suggests that negative shocks have a lesser influence on volatility relative to the positive shocks of the same magnitude. There is positive variance spillover for China, India, Indonesia, Malaysia, Qatar,

Dubai, and Taiwan and there is negative variance spillover Canada, Pakistan, SriLanka, UK, and US. However our empirical result doesn't supports variance spillover effect from Kuwait, Pakistan, Turkey and KSA. With the application of EGARCH for identifying its asymmetric impact of Bahrain Islamic stocks, the Islamic stocks returns of Japan, Malaysia, SriLanka, and Turkey, have noted change in the patterns of integration at variance level.

Table 5.39: Empirical Results of Asymmetric Analysis of Thailand with Other Countries

		Canada	China	India	Indonesia	Japan	Kuwait	Malaysia	Pakistan	Sri-Lanka	Turkey	UK	US	Qatar	KSA	Dubai	Taiwan	Bahrain
ARMA(p,q)		([5],0)	([5],0)	([5],0)	([5],0)	([5],0)	([5],0)	(0,[6])	([5],0)	([5],0)	([5],0)	([5],0)	([5],0)	([5],0)	([5],0)	([5],0)	([6],0)	([5],0)
GARCH(p,q)		(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)
Parameter		Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)
Mean eq	$\hat{\beta}_0$	0.0001 (0.0002)	8.76E-05 (0.0002)	4.23E-05 (0.0002)	6.95E-05 (0.0002)	9.77E-05 (0.0002)	0.0002 (0.0002)	0.0002 (0.0002)	9.32E-06 (0.0002)	0.0003 (0.0002)	0.0001 (0.0002)	0.0001 (0.0002)	3.90E-05 (0.0002)	0.0002 (0.0002)	0.0002 (0.0002)	0.0001 (0.0002)	0.0001 (0.0002)	-0.0112 (0.0183)
	$\hat{\beta}_1$	0.1835** (0.0170)	0.4433** (0.0215)	0.3084** (0.0170)	0.3170** (0.0179)	0.1667** (0.0190)	0.1859** (0.0332)	0.4714** (0.0249)	0.1419** (0.0195)	0.0921** (0.0212)	0.2074** (0.0199)	0.2401** (0.0177)	0.2404** (0.0201)	0.0888** (0.0238)	0.1627** (0.0216)	0.2021** (0.0203)	0.2003** (0.0230)	-0.0657** (0.0259)
	$\hat{\beta}_2$	-0.0533** (0.0240)	-0.0646** (0.0218)	-0.0483** (0.0238)	-0.0638** (0.0244)	-0.0558** (0.0239)	-0.0657** (0.0253)	-0.0534** (0.0265)	-0.0669** (0.0244)	-0.0632** (0.0254)	-0.0538** (0.0250)	-0.0405* (0.0237)	-0.0500** (0.0244)	-0.0683** (0.0252)	-0.0630** (0.0245)	-0.0639** (0.0245)	-0.0495** (0.02520	-0.5026** (0.0681)
Variance eq	$\hat{\gamma}_0$	-0.6548** (0.0810)	-0.7240** (0.1025)	-0.8372** (0.1224)	-1.1617** (0.1830)	-0.5001** (0.0624)	-0.4519** (0.0619)	-0.8087** (0.1141)	-0.4638** (0.0582)	-0.4435** (0.0590)	-0.7689** (0.0930)	-0.6062** (0.0818)	-0.4883** (0.0650)	-0.4825** (0.0627)	-0.5033** (0.0673)	-0.4608** (0.0617)	-0.5426** (0.0770)	0.1138** (0.0169)
	$\hat{\gamma}_1$	0.0967** (0.0191)	0.1226** (0.0221)	0.1064** (0.0191)	0.0846** (0.0212)	0.0953** (0.0164)	0.1159** (0.0163)	0.1135** (0.0238)	0.1056** (0.0171)	0.1196** (0.0171)	0.1008** (0.0217)	0.0948** (0.0186)	0.0941** (0.0176)	0.1073** (0.0166)	0.1150** (0.0177)	0.1030** (0.0159)	0.1157** (0.0187)	-0.1252** (0.0117)
	$\hat{\gamma}_2$	-0.1611** (0.0155)	-0.1485** (0.0166)	-0.1517** (0.0168)	-0.1612** (0.0170)	-0.1384** (0.0134)	-0.1256** (0.0131)	-0.1381** (0.0159)	-0.1309** (0.0125)	-0.1208** (0.0118)	-0.1388** (0.0138)	-0.1519** (0.0135)	-0.1392** (0.0124)	-0.1336** (0.0133)	-0.1273** (0.0133)	-0.1269** (0.0135)	-0.1328** (0.0122)	0.9550** (0.0070)
	$\hat{\gamma}_3$	0.9382** (0.0085)	0.9335** (0.0104)	0.9223** (0.0121)	0.8862** (0.0190)	0.9542** (0.0066)	0.9597** (0.0064)	0.9261** (0.0114)	0.9580** (0.0061)	0.9616** (0.0062)	0.9300** (0.0092)	0.9429** (0.0084)	0.9551** (0.0068)	0.9561** (0.0061)	0.9544** (0.0070)	0.9581** (0.0066)	0.9517** (0.0077)	20.528 (15.051)
	$\hat{\gamma}_4$	70.814** (29.370)	86.312 (56.974)	220.64** (70.442)	220.67** (52.897)	53.252* (30.233)	-61.65 (89.156)	471.16** (127.82)	-5.7623** (15.412)	7.7803 (43.614)	373.41** (65.665)	47.083 (29.315)	46.714 (48.235)	-8.1012 (18.142)	-22.079 (25.496)	-20.616 (19.187)	115.16 (100.13)	-0.0112 (0.0183)

* Denotes significance at the 10% level.
** Denotes significance at the 5% level.

Table 5.40: Empirical Results of Asymmetric Analysis of Bahrain with Other Countries

		Canada	China	India	Indonesia	Japan	Kuwait	Malaysia	Pakistan	Sri-Lanka	Turkey	UK	US	Qatar	KSA	Dubai	Taiwan	Thailand
ARMA(p,q)		([3],0)	([3],0)	([3],0)	([3],0)	([3],0)	([3],0)	([3],0)	([3],0)	([3],0)	([3],0)	([3],0)	([3],0)	([3],0)	([3],0)	([3],0)	([3],0)	([3],0)
GARCH(p,q)		(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)	(1,1)
Parameter		Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)	Coeff. (std.err)
Mean eq	$\hat{\beta}_0$	-0.0008** (0.0002)	-0.0007** (0.0002)	-0.0008** (0.0002)	-0.0007** (0.0002)	-0.0007** (0.0002)	-0.0006** (0.0002)	-0.0008** (0.0002)	-0.0007** (0.0002)	-0.0008** (0.0002)	-0.0008** (0.0002)	-0.0007** (0.0002)	-0.0008** (0.0002)	-0.0008** (0.0002)	-0.0007** (0.0002)	-0.0008** (0.0002)	-0.0008** (0.0002)	-0.0008** (0.0002)
	$\hat{\beta}_1$	0.0251 (0.0164)	0.0158 (0.0238)	0.0117 (0.0177)	0.0498** (0.0182)	0.0494** (0.0221)	0.0757** (0.0308)	0.0325 (0.0254)	-0.0113 (0.0197)	-0.0114 (0.0163)	0.0183 (0.0184)	-0.0271* (0.0140)	0.0162 (0.0229)	0.0271 (0.0226)	-0.0171 (0.0233)	0.0821** (0.0224)	-0.0054 (0.0206)	-0.0446** (0.0219)
	$\hat{\beta}_2$	0.0665** (0.0258)	0.0776** (0.0266)	0.0751** (0.0267)	0.0763** (0.0264)	0.0663** (0.0269)	0.0679** (0.0264)	0.0689** (0.0263)	0.0785** (0.0271)	0.0811** (0.0270)	0.0715** (0.0256)	0.0809** (0.0262)	0.0745** (0.0266)	0.0735** (0.0270)	0.0791** (0.0274)	0.0793** (0.0270)	0.0770** (0.0277)	0.0862** (0.0258)
Variance eq	$\hat{\gamma}_0$	-1.1027** (0.0678)	-1.1572** (0.0764)	-1.1674** (0.0760)	-1.1372** (0.0808)	-1.1429** (0.0701)	-1.1331** (0.0713)	-1.1882** (0.0761)	-1.1399** (0.0699)	-1.1365** (0.0719)	-1.1076** (0.0775)	-1.1401** (0.0664)	-1.1156** (0.0694)	-1.1475** (0.0728)	-1.1486** (0.0730)	-1.1389** (0.0792)	-1.1544** (0.0751)	-1.1643** (0.0764)
	$\hat{\gamma}_1$	0.3878** (0.0162)	0.3824** (0.0160)	0.3839** (0.0163)	0.3852** (0.0180)	0.3994** (0.0153)	0.3929** (0.0154)	0.3830** (0.0164)	0.3937** (0.0157)	0.3975** (0.0152)	0.3870** (0.0155)	0.4032** (0.0169)	0.3873** (0.0160)	0.3899** (0.0152)	0.3934** (0.0152)	0.3956** (0.0155)	0.3655** (0.0180)	0.3988** (0.0164)
	$\hat{\gamma}_2$	0.0511** (0.0096)	0.0547** (0.0110)	0.0494** (0.0098)	0.0563** (0.0100)	0.0578** (0.0091)	0.0563** (0.0095)	0.0578** (0.0103)	0.0521** (0.0098)	0.0563** (0.0093)	0.0497** (0.0100)	0.0501** (0.0097)	0.0482** (0.0097)	0.0562** 0.0097)	0.0557** (0.0093)	0.0522** (0.0094)	0.0521** (0.0105)	0.0551** (0.0094)
	$\hat{\gamma}_3$	0.8988** (0.0069)	0.8958** (0.0077)	0.8951** (0.0076)	0.8967** (0.0080)	0.8961** (0.0072)	0.8976** (0.0073)	0.8936** (0.0076)	0.8958** (0.0072)	0.8962** (0.0075)	0.8989** (0.0078)	0.8939** (0.0069)	0.8972** (0.0072)	0.8958** (0.0074)	0.8955** (0.0075)	0.8973** (0.0083)	0.8990** (0.0074)	0.8957** (0.0078)
	$\hat{\gamma}_4$	-55.258* (28.361)	204.51** (63.723)	150.02* (82.044)	34.195** (38.2835)	2.9574 (63.2422)	146.13 (91.6594)	454.209** (128.088)	-18.7309 (25.8467)	-51.5317** (36.533)	-32.854 (65.927)	-152.749** (33.1092)	-123.42** (50.273)	58.938** (26.692)	24.098 (27.923)	46.258* (28.289)	553.16** (98.896)	120.3613** (56.41)

5.4. Post Estimation Residuals Diagnostic Tests

As discussed in chapter 4 it is necessary to check that model is correctly specified. In our study we apply ARCH LM test, Q-test, Q^2- test and normality test are applied, but the results of ARCH LM test is presented in Appendix D. ARCH test carries out langrage multiplier test to check whether the standardized residual exhibits additional ARCH. If the variance equation is correctly specified, there should be no ARCH left in the standardized residuals. The test is conducted for the hypothesis.

$$H_0: no\ ARCH\ effect$$

$$H_1: ARCH\ effect\ is\ present$$

Earlier the Pre estimation test (Table 5.4 in Appendix B) has shown, strong evidence of the presence of ARCH effect in the series. After the GARCH and EGARCH modeling, we now analyze the results of above mentioned test after performing our analysis. Appendix D (Post Estimation results) show no evidence of existence the result of ARCH effect in residuals i-e we unable to find any evidence against null hypothesis. Indicating that this is the best fitted model as it removes ARCH effect from series.

5.5 Conclusion

We can conclude that Islamic stock of some domestic country are integrated with mean and volatility of foreign country's Islamic stocks, results are diverse for same country it is integrated and for some it is not integrated. As far as asymmetric effect we have found that negative shock have greater impact the good shock for all countries expect Bahrain which have positive asymmetric impact. And when we analyze asymmetric effects we also get to know that some country's which shows integrated effect at variance level have not influenced, on domestic country's Islamic stocks, basically it was asymmetric effect, earlier which was identified as impact of foreign country.

Chapter 6

Summary and Conclusion

6.1 Summary

Finaical integration among variance capital markets across countries has been explored in litarure since long. The inception of Islamic stocks with the new

The Islamic stocks differs from the conventional stocks with respect to the condition imposed on nature of business of company that is these must be Halal. The criteria on which Islamic stock are screened on a number of criteria related on a number of criteria related to financial and business activites of the investment company for which it is essential to maintain a supervisory board. The team forming supervisory board consists of qualified Islamic researchers who are associated with a Shariah Supervisory Board.

Exploring financial integration among Islamic stock market is of great intrest now. The current study examine the exisitance and the exitance and drirction of assoctaion between Islamic stock returns and their volatility. The detailed analysis of return and volatility of Islamic stocks at cross country level explores pairwise analysis integration, along with investigates the asymmetric impact of positive and negative shocks on volatility. This is achived under three objectives.

We have used daily Islamic stock returns of 18 countries from July 2009 to July 2016 and apply GARCH (p,q) for exploring pairwise analysis integration of islamic stock returns and volatility under the first and second objectives. Our results identify strong integration with respect to mean in Islamic stocks among selected country. The pairwise analysis indicates that Turkey, China, India, KSA, Thailand, Dubai have mean spillover effect on all countries expect Bahrain. Japan, Canada, and Taiwan have mean spillover effect with all countries expect SriLanka. Similarly there is mean spillover effect noted Qatar on all countries expect India,

Dubai, Bahrain, SriLanka, and Pakistan on all countries expect Canada, Japan, US. Further, US have mean spillover effect on all countries expect Taiwan, Bahrain, and SriLanka, and UK have mean spillover effect on all countries expect SriLanka. We have also noted that the Islamic stock market of Bahrain has mean spillover effect on India, Indonesia, Pakistan, UK, Taiwan, SriLanka and Kuwait. SriLanka has mean spillover effect on all countries expect China, Indonesia, Japan, Pakistan, and UK. Kuwait has mean spillover effect on all countries expect Canada and Bahrain. Lastly Indonesia has mean spillover effect on all countries expect Dubai, and Bahrain (can seen from Table 6.1).

We have also extended our analysis to examine the volatility spillover effect among various countries. Pakistan has negative volatility spillover effect on 3 countries. Malaysia has cause positive volatility spillover effect on 9 countries i-e Pakistan, Bahrain, China, Indonesia, Turkey, UK, Dubai, and Thailand, along with negative effect from KSA. Bahrain has positive volatility spillover effect on Pakistan, Indonesia, Srilanka, Turkey, Qatar, KSA, Dubai, and SriLanka and negative on Canada, China, and UK. Canada has positive variance spillover effect on 11 countries, and it shows negative variance spillover effect and no effect 3 countries. China have positively variance spillover effect on 10 countries t and negative with Dubai. India have positive volatility spillover effect on 4 Islamic stock markets of Pakistan, Bahrain, Srilanka, and Taiwan and negative on 5 Islamic stocks markets such as Malaysia, UK, US, KSA, and Dubai. Indonesia has impose positive volatility spillover effect on 6 countries, and negatively significant for 3 countries. Japan has only positive essect on Pakistan, Bahrain, SriLanka and Turkey. Kuwait have positively variance spillover effect on US, KSA, Taiwan, and Dubai and negative effect on Pakistan, UK and Qatar. SriLanka has positive variance spillover effect on following 5 stock markets; Pakistan, Malaysia, India, Indonesia, and UK and negative on US.

Turkey have positive variance spillover effect on Pakistan and Dubai, and negative on Bahrain, Canada, and Qatar. US have positive volatility spillover effect on 9 stocks and negative on Taiwan, and yield insignificant volatility spillover effect rest of countries indicating no volatility integration. UK have positive variance spillover effect on Pakistan, China, Japan, Kuwait, SriLanka, US, and Taiwan, and negative on KSA, Dubai, and Bahrain. Qatar has positive volatility spillover effect on 6 country's stock which are, Japan, Pakistan, KSA, Taiwan, Bahrain, and Kuwait, and negative on China and India, whereas it does not follow Garch restrictions on Duhai. KSA has positive variance spillover effect on 8 stock markets. Dubai has positive variance spillover effect on Qatar, Bahrain and Kuwait, and negative for China, Indonesia, Pakistan, Turkey, UK, and Thailand. Taiwan has positive variance spillover effect on Canada, India, Indonesia Pakistan, US, UK, Bahrain, and SriLanka, and negative on KSA, Dubai, while with other countries it appear insignificant. Thailand has positive variance spillover effect on China, India, Indonesia, Japan, Malaysia, US, UK, Taiwan, Bahrain, SriLanka, and Kuwait. (Can seen from Table 6.2).

Lastly the asymmetric impact examined among selected countries show leverage effects which are negative and significant almost for all countries indicating that bad news has greater volatility than good news. It implies that negative shocks have greater consequences on volatility comparatively to the positive shocks of the same magnitude. While it is only Bahrain that shows positive significant asymmetric impact which means that bad news has smaller volatility than good news. Identifying the asymmetric impacts of domestic country's Islamic stock, we have found that in some cases, the volatility spillover effect of Islamic stocks of foreign country changes from significant to in significant, indicating that on separating the asymmetric effect these spillover effect behavior become different, and it becomes clear that it may be their own shock effect which seems erroneously as the effect of other country's stock. (can seen from Table 6.3 and Table 6.4).

Table 6.1: Mean Spillover Results

Pakistan		Malaysia		Canada	China	India	Indonesia	Japan	Kuwait	Srilanka	Turkey	UK	US	qatar	KSA	Dubai	Taiwan	Thailand
Malaysia	Pakistan		Bahrain	Canada	China	India	Indonesia	Japan	Kuwait	Srilanka	Turkey	UK	US	qatar	KSA	Dubai	Taiwan	Thailand
Bahrain	Pakistan	Malaysia		Canada	China	India		Japan		Srilanka		UK			KSA		Taiwan	Thailand
Canada		Malaysia			China	India	Indonesia	Japan		Srilanka	Turkey	UK	US	qatar	KSA	Dubai	Taiwan	Thailand
China	Pakistan	Malaysia	Bahrain	Canada		India	Indonesia	Japan	Kuwait		Turkey	UK	US	qatar	KSA	Dubai	Taiwan	Thailand
India	Pakistan	Malaysia		Canada	China		Indonesia	Japan	Kuwait	Srilanka	Turkey	UK	US		KSA	Dubai	Taiwan	Thailand
Indonesia	Pakistan	Malaysia		Canada	China	India		Japan	Kuwait		Turkey	UK	US	qatar	KSA	Dubai	Taiwan	Thailand
Japan		Malaysia	Bahrain	Canada	China	India	Indonesia		Kuwait		Turkey	UK	US	qatar	KSA	Dubai	Taiwan	Thailand
Kuwait	Pakistan	Malaysia		Canada	China	India	Indonesia	Japan		Srilanka	Turkey	UK	US	qatar	KSA	Dubai	Taiwan	Thailand
Srilanka	Pakistan	Malaysia			China	India	Indonesia		Kuwait		Turkey				KSA	Dubai		Thailand
Turkey	Pakistan	Malaysia	Bahrain	Canada	China	India	Indonesia	Japan	Kuwait	Srilanka		UK	US	qatar	KSA	Dubai	Taiwan	Thailand
UK	Pakistan	Malaysia		Canada	China	India	Indonesia	Japan	Kuwait		Turkey		US	qatar	KSA	Dubai	Taiwan	Thailand
US		Malaysia	Bahrain	Canada	China	India	Indonesia	Japan	Kuwait		Turkey	UK		qatar	KSA	Dubai	Taiwan	Thailand
qatar	Pakistan	Malaysia	Bahrain	Canada	China	India	Indonesia	Japan	Kuwait	Srilanka	Turkey	UK	US		KSA	Dubai	Taiwan	Thailand
KSA	Pakistan	Malaysia	Bahrain	Canada	China	India	Indonesia	Japan	Kuwait	Srilanka	Turkey	UK	US	qatar		Dubai	Taiwan	Thailand
Dubai	Pakistan	Malaysia	Bahrain	Canada	China	India	Indonesia	Japan	Kuwait	Srilanka	Turkey	UK	US		KSA		Taiwan	Thailand
Taiwan	Pakistan	Malaysia		Canada	China	India	Indonesia	Japan	Kuwait	Srilanka	Turkey	UK		qatar	KSA	Dubai		Thailand
Thailand	Pakistan	Malaysia	Bahrain	Canada	China	India	Indonesia	Japan	Kuwait	Srilanka	Turkey	UK	US	qatar	KSA	Dubai	Taiwan	

Table 6.2 Variance Spillover Results

Pakistan		Malaysia	Bahrain	Canada	China	India	Indonesia	Japan	Kuwait	Srilanka	Turkey	UK	US	qatar	KSA	Dubai	Taiwan	
Malaysia				Canada	China	India				Srilanka			US		KSA			Thailand
Bahrain		Malaysia		Canada	China	India	Indonesia	Japan			Turkey	UK		qatar		Dubai	Taiwan	Thailand
Canada			Bahrain				Indonesia				Turkey		US				Taiwan	
China		Malaysia	Bahrain	Canada								UK	US	qatar		Dubai		Thailand
India				Canada	China		Indonesia			Srilanka			US	qatar			Taiwan	Thailand
Indonesia		Malaysia	Bahrain	Canada						Srilanka			US			Dubai	Taiwan	Thailand
Japan	Pakistan			Canada	China							UK	US	qatar	KSA			Thailand
Kuwait	Pakistan			Canada	China							UK	US	qatar	KSA	Dubai		Thailand
Srilanka			Bahrain	Canada	China	India		Japan				UK			KSA		Taiwan	Thailand
Turkey		Malaysia	Bahrain	Canada	China		Indonesia	Japan								Dubai		
UK	Pakistan	Malaysia	Bahrain	Canada	China	India			Kuwait	Srilanka			US		KSA	Dubai	Taiwan	Thailand
US		Malaysia		Canada	China	India	Indonesia		Kuwait	Srilanka		UK			KSA		Taiwan	Thailand
qatar			Bahrain						Kuwait		Turkey				KSA	Dubai		
KSA	Pakistan	Malaysia	Bahrain	Canada		India	Indonesia		Kuwait			UK		qatar			Taiwan	
Dubai		Malaysia	Bahrain		China	India	Indonesia		Kuwait		Turkey	UK		qatar			Taiwan	
Taiwan				Canada		India			Kuwait	Srilanka		UK	US	Qatar				Thailand
Thailand		Malaysia					Indonesia									Dubai		

Positive
Negative

Table 6.3: Asymmetric Mean Spillover Results

Canada		China	India	Indonesia	Japan		Malaysia		Srilanka	Turkey	UK	US	Qatar	KSA	Dubai	Taiwan	Thailand	
China	Canada		India	Indonesia	Japan	Kuwait	Malaysia	Pakistan		Turkey	UK	US	Qatar	KSA	Dubai	Taiwan	Thailand	Bahrain
India	Canada	China		Indonesia	Japan	Kuwait	Malaysia	Pakistan	Srilanka	Turkey	UK	US		KSA	Dubai	Taiwan	Thailand	
Indonesia	Canada	China	India		Japan	Kuwait	Malaysia	Pakistan		Turkey	UK	US	Qatar	KSA	Dubai	Taiwan	Thailand	
Japan	Canada	China	India	Indonesia		Kuwait	Malaysia			Turkey	UK	US	Qatar	KSA	Dubai	Taiwan	Thailand	Bahrain
Kuwait	Canada	China	India	Indonesia	Japan		Malaysia	Pakistan	Srilanka	Turkey	UK	US	Qatar	KSA	Dubai	Taiwan	Thailand	
Malaysia	Canada	China	India	Indonesia	Japan	Kuwait		Pakistan	Srilanka	Turkey	UK	US	Qatar	KSA	Dubai	Taiwan	Thailand	Bahrain
pakistan	Canada	China	India	Indonesia	Japan	Kuwait	Malaysia		Srilanka	Turkey	UK	US	Qatar	KSA	Dubai	Taiwan	Thailand	
Srilanka		China	India	Indonesia		Kuwait	Malaysia	Pakistan		Turkey		US		KSA	Dubai		Thailand	
Turkey	Canada	China	India	Indonesia	Japan	Kuwait	Malaysia	Pakistan	Srilanka		UK	US	Qatar	KSA	Dubai	Taiwan	Thailand	Bahrain
UK	Canada	China	India	Indonesia	Japan	Kuwait	Malaysia	Pakistan		Turkey		US	Qatar	KSA	Dubai	Taiwan	Thailand	
US	Canada	China	India	Indonesia	Japan	Kuwait	Malaysia			Turkey	UK		Qatar	KSA	Dubai	Taiwan	Thailand	Bahrain
Qatar	Canada	China	India	Indonesia	Japan	Kuwait	Malaysia	Pakistan	Srilanka	Turkey	UK	US		KSA	Dubai	Taiwan	Thailand	Bahrain
KSA	Canada	China	India	Indonesia	Japan	Kuwait	Malaysia	Pakistan	Srilanka	Turkey	UK	US	Qatar		Dubai	Taiwan	Thailand	Bahrain
Dubai	Canada	China	India	Indonesia	Japan	Kuwait	Malaysia	Pakistan	Srilanka	Turkey	UK	US		KSA		Taiwan	Thailand	Bahrain
Taiwan	Canada	China	India	Indonesia	Japan	Kuwait	Malaysia	Pakistan	Srilanka	Turkey	UK	US	Qatar	KSA	Dubai		Thailand	
Thailand	Canada	China	India	Indonesia	Japan	Kuwait	Malaysia	Pakistan	Srilanka	Turkey	UK	US	Qatar	KSA	Dubai	Taiwan		Bahrain
Bahrain	Canada	China	India		Japan		Malaysia	Pakistan	Srilanka		UK			KSA		Taiwan	Thailand	

Table 6.4: Asymmetric Variance Spillover Results

Canada		China			Japan	Kuwait										Taiwan		
China	Canada			Indonesia				Pakistan		Turkey	UK	US		KSA		Taiwan		
India		China		Indonesia		Kuwait										Taiwan	Thailand	
Indonesia		China	India				Malaysia			Turkey						Taiwan		
Japan	Canada	China				Kuwait	Malaysia			Turkey	UK	US		KSA	Dubai	Taiwan	Thailand	
Kuwait			India				Malaysia						Qatar	KSA	Dubai	Taiwan		
Malaysia	Canada	China	India	Indonesia		Kuwait				Turkey	UK	US	Qatar	KSA	Dubai	Taiwan	Thailand	
Pakistan	Canada	China	India	Indonesia		Kuwait					UK	US		KSA		Taiwan	Thailand	
Srilanka	Canada	China	India	Indonesia		Kuwait					UK							
Turkey		China		Indonesia	Japan		Malaysia				UK	US						Bahrain
UK	Canada	China							Srilanka			US		KSA		Taiwan	Thailand	
US	Canada	China		Indonesia			Malaysia		Srilanka		UK			KSA		Taiwan	Thailand	
Qatar	Canada	China	India	Indonesia	Japan		Malaysia	Pakistan	Srilanka	Turkey	UK	US		KSA		Taiwan	Thailand	Bahrain
KSA	Canada	China	India	Indonesia	Japan	Kuwait			Srilanka	Turkey	UK		Qatar			Taiwan		Bahrain
Dubai	Canada	China	India	Indonesia	Japan	Kuwait	Malaysia	Pakistan	Srilanka	Turkey	UK	US	Qatar	KSA		Taiwan		Bahrain
Taiwan	Canada		India	Indonesia			Malaysia	Pakistan		Turkey								Bahrain
Thailand	Canada		India	Indonesia	Japan		Malaysia	Pakistan		Turkey								
Bahrain	Canada	China	India	Indonesia			Malaysia	Pakistan	Srilanka		UK	US	Qatar		Dubai	Taiwan		

Positive
Negative

6.2 Policy Guideline

The study attempts to provide more accurate information to aid global portfolio managers in achieving an efficient mean-variance frontier and to provide policy-makers with a more definite basis on which to formulate appropriate risk-management strategy, it is of interest to conduct an empirical investigation on stock-return reaction to riskforeign investors to diminish portfolio risk by investing in Islamic stocks in such a way that they can avoid complete or partial loss. In case markets are integrated, the shocks in one country stocks markets will penetrate to another country' stocks, both for positive and negative shocks. In case of insignificant integration of Islamic stock returns, the shocks will not affect each other stock returns. It guides policy makers to design such policy that will help to obtain better and sustainable growth of Portfolio Investment. This study also attempts to provide idea of the policy makers to formulate policies through which the financial market of the domestic country stock market can be protected from the possible bearish trend of any foreign other country's financial market because of integration with other country. This study is an important instrument for financial institutions, portfolio managers, market players and academician to identify the nature and level of integration and information transmission between the financial markets. The financial managers get more understanding about the management of portfolio which is badly influenced by the stock prices. The market players may use this information for portfolio diversification and hedging. The policy makers can minimize the effects of spread of stock prices. The stability of stock prices is very important for portfolio and foreign direct investments, which improves macroeconomic stability and positive impact the economic growth. Through these results the investor/market player of one market can guess the performance of other markets. This study identies the effect of good and bad news on stock markets by analyzing positive and negative impact of the variation of asymmetric shocks and also provide a new field of research to researchers and academicians.

6.3 Further Research

This study can be extended by including the linkage between of foreign exchange rates and stock markets integration and by focusing on the dynamic interactions between Islamic stock returns and inflation. To cover theses relationship would lead to a multivariate analysis which would include factors like exchange rate, inflation, effect of media or social media, political instability or terrorism on the stock market as these factors also have very strong impact on investors mind. News affects markets, Social media makes the impact of news stronger, sudden and long lasting. It can also be noted that famous people or personalities and astrologers also cause impact on mind of their followers. Their ideas or decisions directly or indirectly affect in changing decisions of investors. Therefore multivariate analysis would enable to examine not only the foreign countries Islamic stock markets impact but also identify the impact of other facts along with their dynamics interaction noting their dependcies if any.

Financial markets have been directly and indirectly become victims of political instability, terrorism, and the financial markets were not only threatened with major activity disorders caused by the massive damage to property and communication systems, but also with high levels of uncertainty and market volatility. It not only affects investor of the same country but also on foreign country's investor, and it is not only for current time period but can also cause effects in future leading to research study compressing multivariate analysis of asymmetric, on Islamic stock market on home and foreign country along with other regressor. Moreover multivariate integration by analyzing the impact of more than one country Islamic stock at the same time.

Appendix A

A. Graphs showing series are not stationary (level series).

Figure 5.1: Islamic stock prices of Pakistan

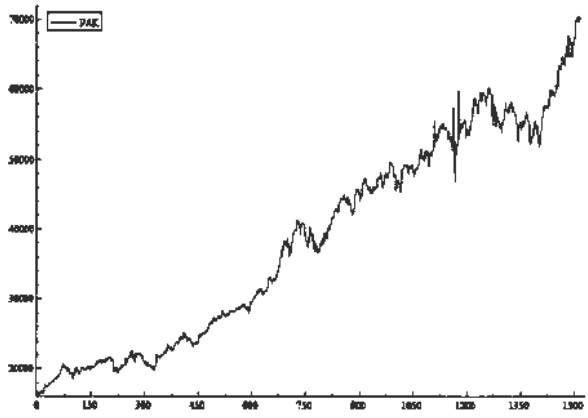


Figure 5.2: Islamic stock prices of US

Figure 5.3: Islamic stock prices of Canada

Figure 5.4: Islamic stock prices of China

Figure 5.5: Islamic stock prices of Japan

Figure 5.6: Islamic stock prices of Malaysia

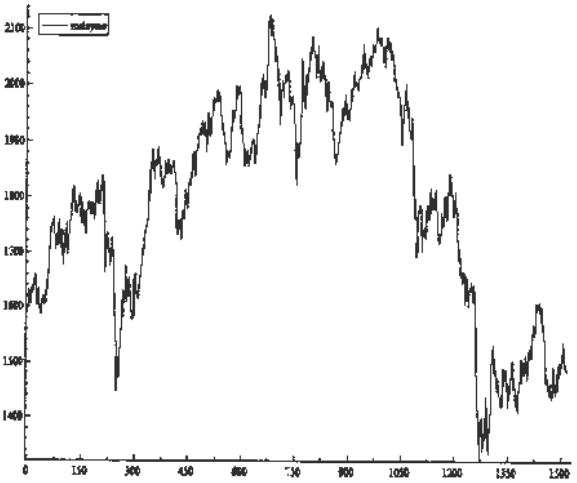


Figure 5.7: Islamic stock prices of Turkey

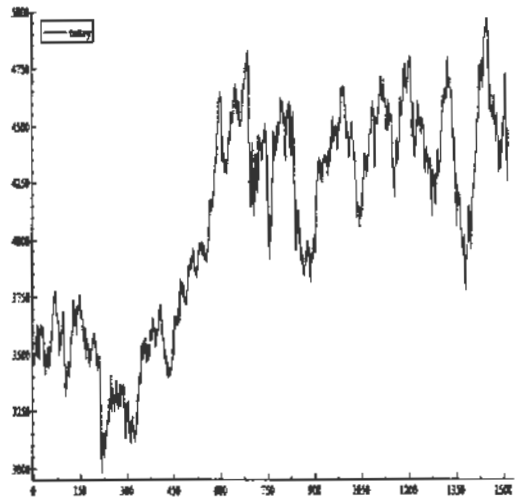


Figure 5.8: Islamic stock prices of UK

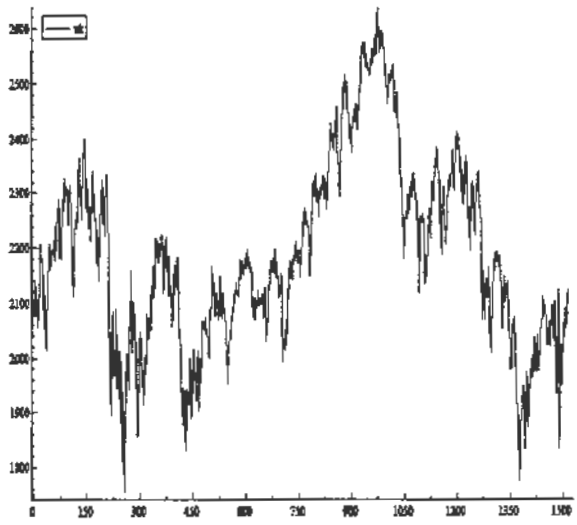


Figure 5.9: Islamic stock prices of Kuwait

Figure 5.10: Islamic stock prices of Indonesia

Figure 5.11: Islamic stock prices of Qatar

Figure 5.12: Islamic stock prices of Saudi Arabia

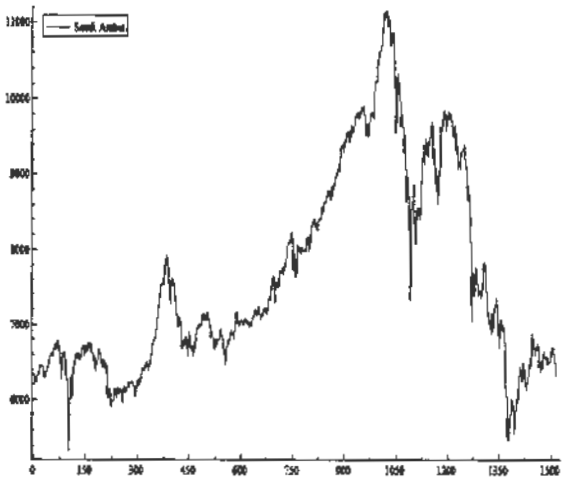


Figure 5.13: Islamic stock prices of SriLanka

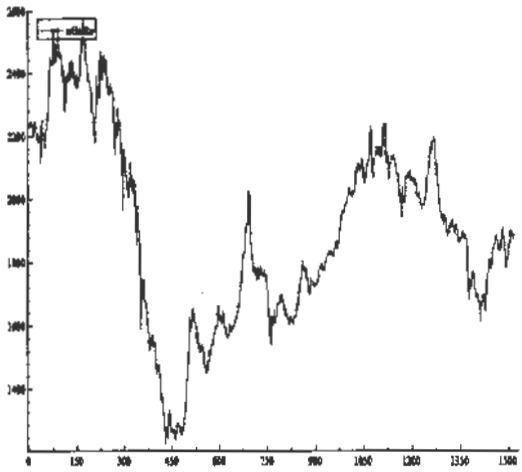


Figure 5.14: Islamic stock prices of Taiwan

Figure 5.15: Islamic stock prices of Dubai

Figure 5.16: Islamic stock prices of India

Figure 5.17: Islamic stock prices of Thailand

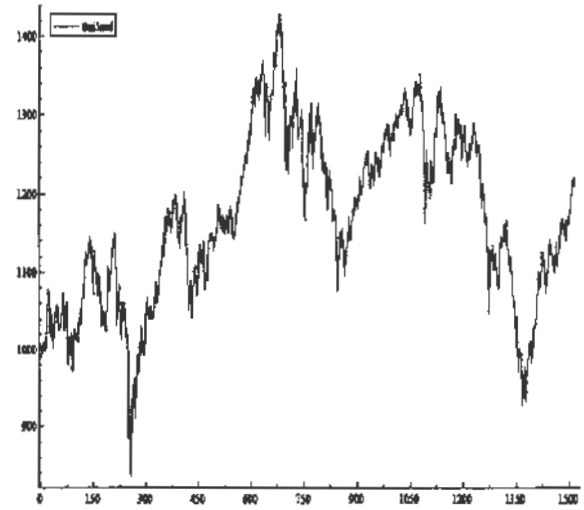
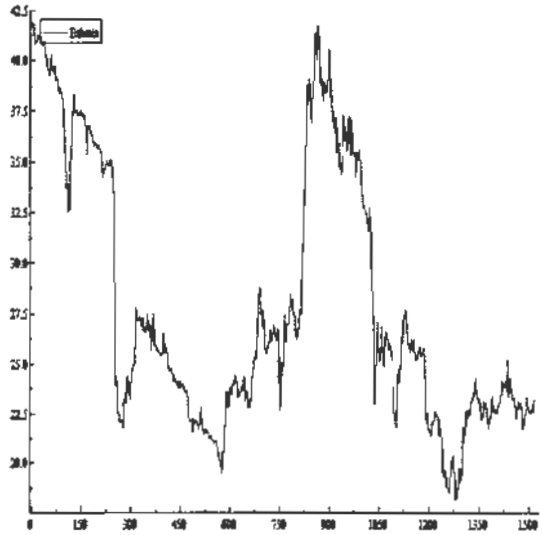


Figure 5.18: Islamic stock prices of Bahrain



B. Graphs showing series are stationary (Return series).

Figure 5.19: Islamic stock prices returns of Pakistan

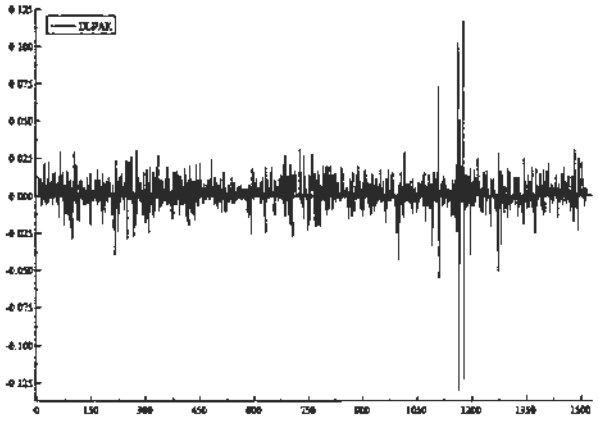


Figure 5.20: Islamic stock prices returns of US

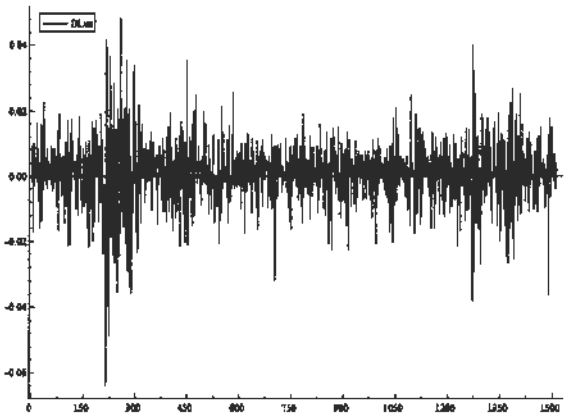


Figure 5.21: Islamic stock prices returns Canada

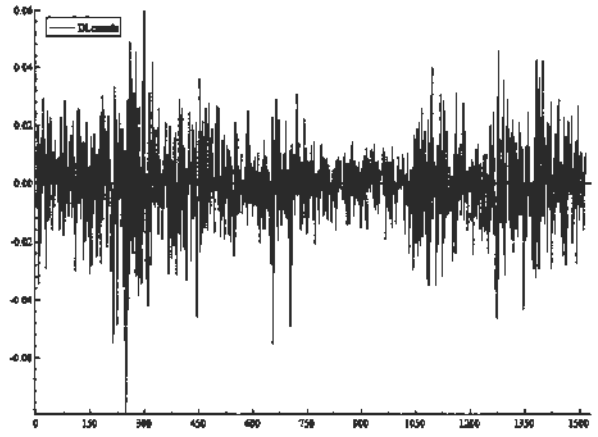


Figure 5.22: Islamic stock prices returns China

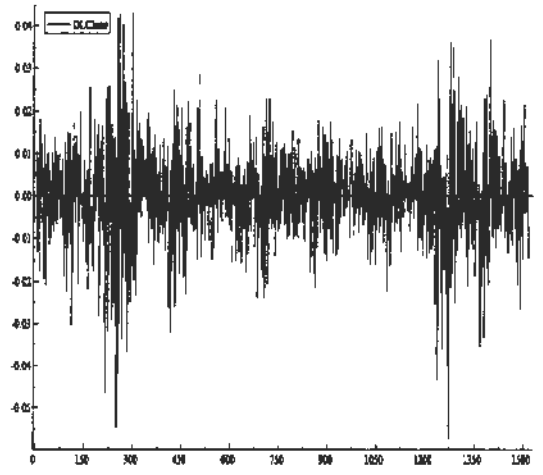


Figure 5.23: Islamic stock prices returns Japan

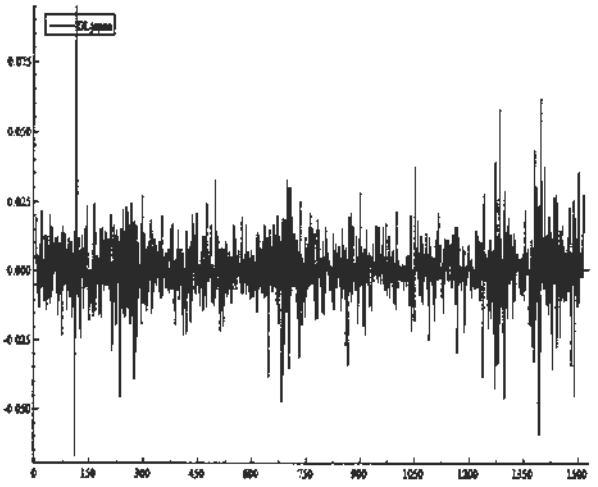


Figure 5.24: Islamic stock prices returns Malaysia

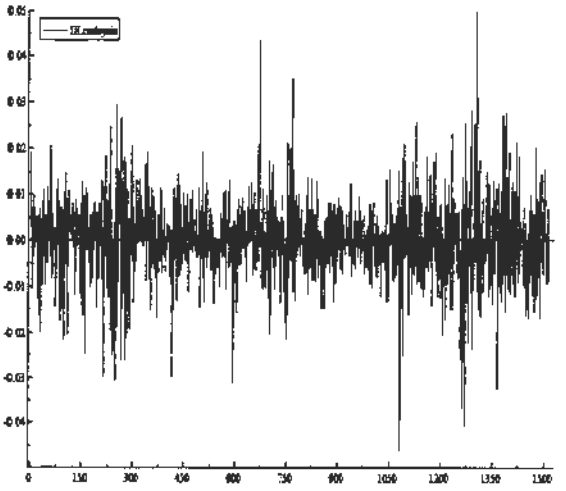


Figure 5.25: Islamic stock prices returns Turkey

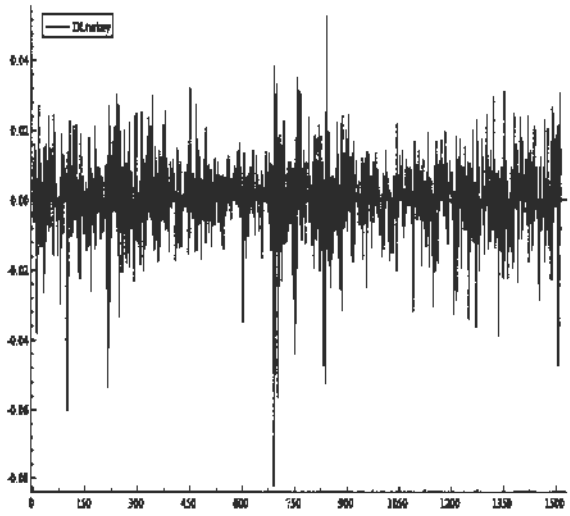


Figure 5.26: Islamic stock prices returns UK

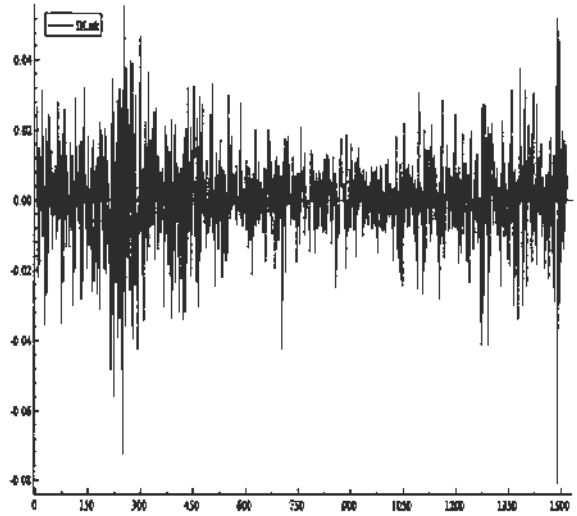


Figure 5.27: Islamic stock prices returns Kuwait

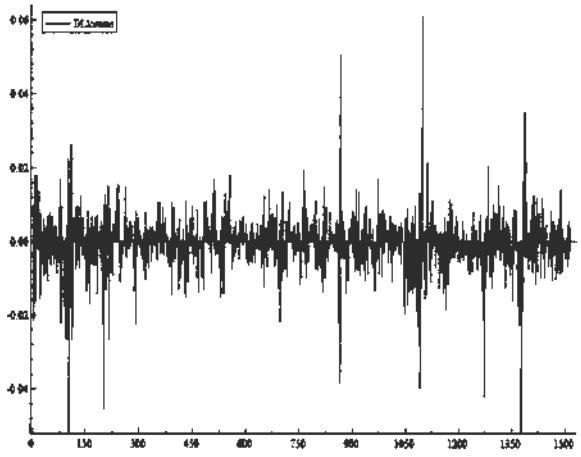


Figure 5.28: Islamic stock prices returns Indonesia

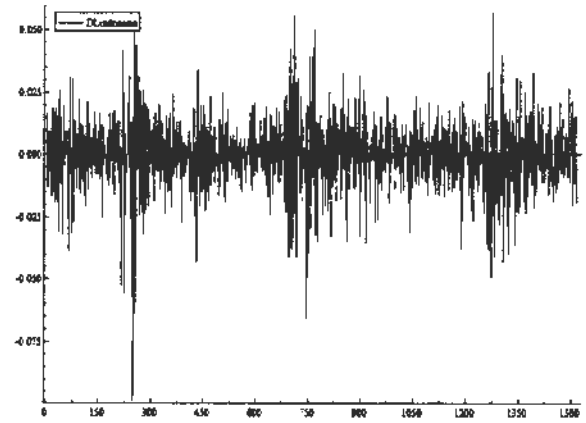


Figure 5.29: Islamic stock prices returns Saudi Arabia

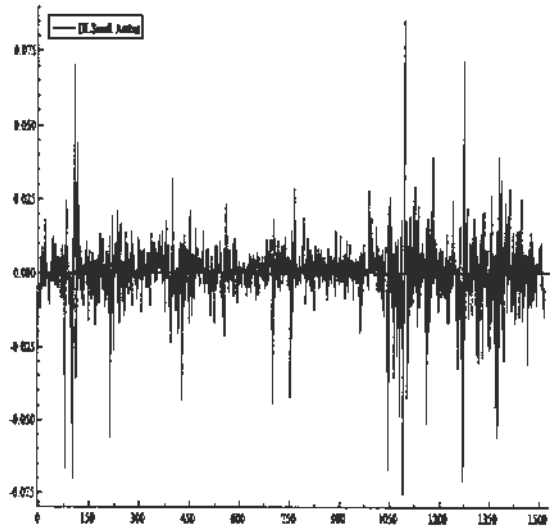


Figure 5.30: Islamic stock prices returns Qatar

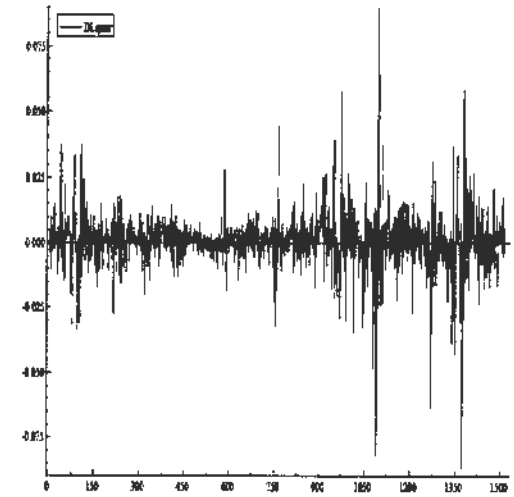


Figure 5.31: Islamic stock prices returns SriLanka

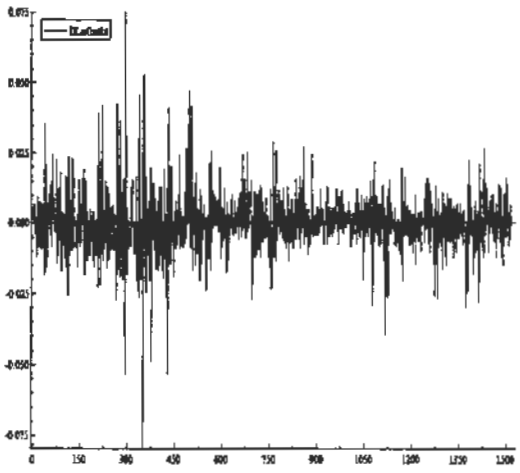


Figure 5.32: Islamic stock prices returns Taiwan

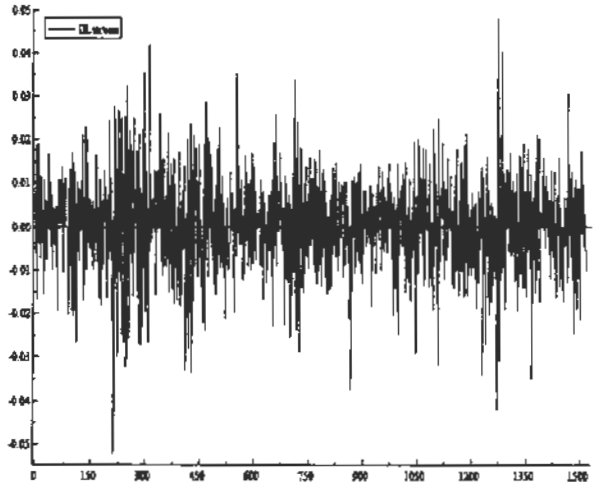


Figure 5.33: Islamic stock prices returns Dubai

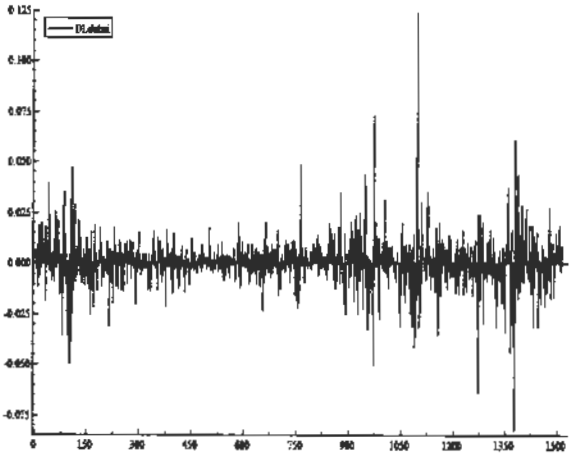


Figure 5.34: Islamic stock prices returns India

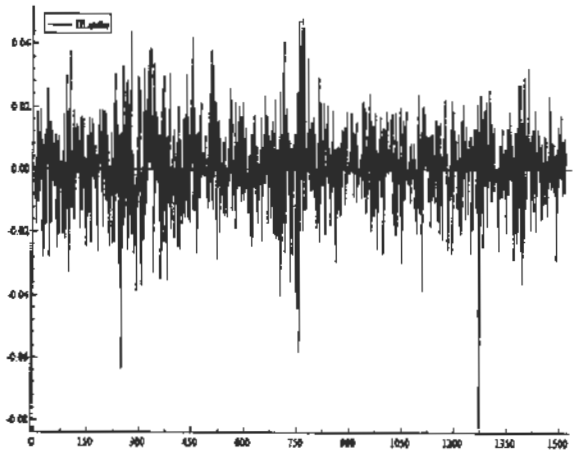


Figure 5.34: Islamic stock prices returns Thailand

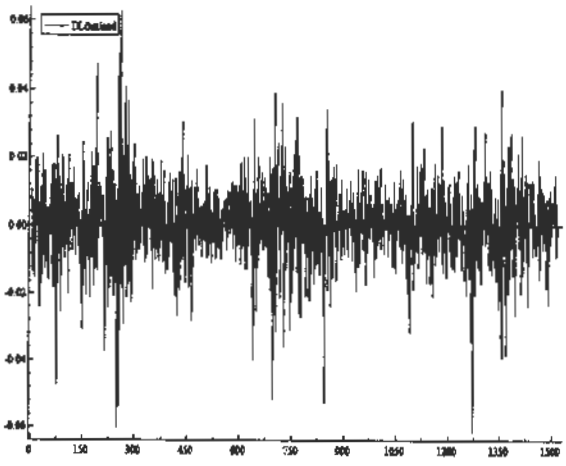
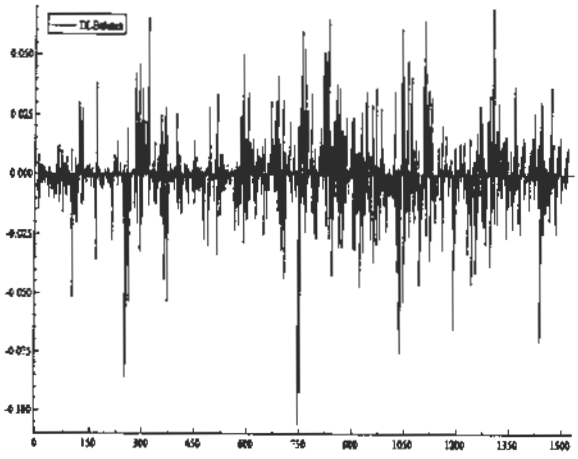


Figure 5.35: Islamic stock prices returns Bahrain



Appendix B

Table 5.1: KPSS test results showing series is not stationary

Countries	KPSS test results
US	48.5008
UK	6.38683
Turkey	34.1881
Thailand	12.5397
Taiwan	27.3022
SriLanka	7.7196
Qatar	44.2694
Pakistan	50.0418
Malaysia	12.3303
Kuwait	24.343
KSA	17.5659
Japan	41.0165
Indonesia	31.4686
India	9.8919
Dubai	29.817
China	16.5491
Canada	8.4529
Bahrain	11.9151
KPSS: 1% 0.739	5% 0.463 10% 0.347

Table 5.2: Existence of ARCH effect and KPSS test results showing series is stationary

S.no	Countries	ARCH test (1-2)	ARCH test (1-5)	Q(5) Raw data	Q(10) Raw data	Q^2(5) Squared data	Q^2(10) Squared data	KPSS
1	US	111.51 [0.0000]	53.651 [0.0000]	19.2861 [0.0017]	21.7675 [0.0163]	425.845 [0.0000]	659.170 [0.0000]	0.0379
2	Canada	25.994 [0.0000]	16.597 [0.0000]	17.1943 [0.0041]	20.8678 [0.0220]	117.600 [0.0000]	303.862 [0.0000]	0.0361
3	China	17.463 [0.0000]	29.096 [0.0000]	42.9141 [0.0000]	53.6557 [0.0000]	172.359 [0.0000]	311.982 [0.0000]	0.0425
4	japan	116.38 [0.0000]	50.449 [0.0000]	29.5951 [0.0000]	35.8608 [0.0001]	289.268 [0.0000]	299.024 [0.0000]	0.0410
5	Malaysia	28.169 [0.0000]	28.169 [0.0000]	26.8394 [0.0001]	28.8748 [0.0013]	91.2288 [0.0000]	156.261 [0.0000]	0.2475
6	turkey	21.265 [0.0000]	17.522 [0.0000]	7.77054 [0.1693]	11.2326 [0.3397]	115.321 [0.0000]	153.039 [0.0000]	0.0368
7	UK	43.807 [0.0000]	33.139 [0.0000]	25.1412 [0.0001]	28.2418 [0.0016]	258.375 [0.0000]	380.043 [0.0000]	0.0296
8	Kuwait	33.233 [0.0000]	25.759 [0.0000]	19.8973 [0.0013]	27.3390 [0.0023]	158.841 [0.0000]	227.654 [0.0000]	0.1407
9	Indonesia	20.180 [0.0000]	24.588 [0.0000]	42.9675 [0.0000]	56.4609 [0.0000]	157.043 [0.0000]	368.341 [0.0000]	0.0252
10	Qatar	64.325 [0.0000]	63.922 [0.0000]	51.4613 [0.0000]	59.1063 [0.0000]	413.795 [0.0000]	503.635 [0.0000]	0.2316
11	Saudi Arabia	171.08 [0.0000]	69.013 [0.0000]	23.2066 [0.0003]	33.8418 [0.0002]	419.902 [0.0000]	467.915 [0.0000]	0.2596
12	SriLanka	51.958 [0.0000]	29.791 [0.0000]	14.6072 [0.0122]	27.6005 [0.0021]	201.135 [0.0000]	224.541 [0.0000]	0.2069
13	Taiwan	25.248 [0.0000]	13.723 [0.0000]	9.13349 [0.1039]	23.7688 [0.0082]	94.5821 [0.0000]	166.153 [0.0000]	0.0317
14	Dubai	13.264 [0.0000]	8.3373 [0.0000]	29.9453 [0.0000]	34.9053 [0.0001]	53.4876 [0.0000]	96.1156 [0.0000]	0.2023
15	India	11.671 [0.0000]	13.064 [0.0000]	11.1625 [0.0482]	20.5724 [0.0243]	83.8758 [0.0000]	147.677 [0.0000]	0.1676
16	Thailand	33.385 [0.0000]	34.092 [0.0000]	7.54507 [0.1831]	16.3833 [0.0892]	239.285 [0.0000]	363.987 [0.0000]	0.0586
17	Pakistan	212.84 [0.0000]	94.819 [0.0000]	25.4586 [0.0001]	37.7380 [0.0000]	318.500 [0.0000]	320.729 [0.0000]	0.0527
18	Bahrain	43.095 [0.0000]	30.398 [0.0000]	44.3588 [0.0000]	7.6905 [0.0000]	204.532 [0.0000]	238.908 [0.0000]	0.1614
KPSS: 1% 0.739		5% 0.463	10% 0.347					

Table 5.3. Descriptive Statistics

Countries	Mean	Median	Max	Min	Std. Dev	Skewness	Kurtosis	Jarque-Bera	JB test (P-value)	Sum	Sum Sq. Dev.
US	0.0004	0.0004	0.0483	-0.0641	0.0096	-0.3410	7.0122	1044.1530	0.0000	0.6176	0.1379
UK	1.43E-05	0.0000	0.0554	-0.0804	0.0127	-0.4036	6.3035	729.0711	0.0000	0.0217	0.2430
Turkey	0.0002	0.0000	0.0525	-0.0823	0.0114	-0.7533	7.5278	1435.4790	0.0000	0.2434	0.1974
Thailand	0.0001	0.0000	0.0627	-0.0613	0.0115	-0.2899	6.3539	730.3397	0.0000	0.2062	0.1986
Taiwan	0.0001	0.0000	0.0478	-0.0523	0.0101	-0.1918	5.0622	277.3816	0.0000	0.2125	0.1542
SriLanka	-0.0001	0.0000	0.0749	-0.0795	0.0100	0.0923	11.2385	4280.9320	0.0000	-0.1656	0.1519
Qatar	0.0007	0.0007	0.0894	-0.0865	0.0106	-0.3784	16.1182	10877.5100	0.0000	0.9957	0.1692
Pakistan	0.0010	0.0000	0.1166	-0.1308	0.0113	-0.7700	37.6695	75923.9400	0.0000	1.4625	0.1920
Malaysia	-4.53E-05	0.0000	0.0495	-0.046	0.0085	-0.0910	6.3506	709.8171	0.0000	-0.0685	0.1089
Kuwait	-0.0003	0.0000	0.0607	-0.052	0.0071	-0.5697	16.0180	10765.4100	0.0000	-0.4794	0.0768
KSA	-5.09E-06	0.0004	0.0855	-0.0755	0.0113	-0.8801	15.0195	9302.8850	0.0000	-0.0077	0.1915
Japan	0.0003	0.0004	0.0948	-0.0668	0.0113	-0.0251	10.2089	3276.3000	0.0000	0.3969	0.1931
Indonesia	0.0002	0.0001	0.0564	-0.0991	0.0132	-0.5738	7.3722	1288.1460	0.0000	0.305	0.2625
India	-7.91E-05	0.0000	0.0481	-0.0822	0.0127	-0.2866	5.4695	405.1701	0.0000	-0.1197	0.2423
Dubai	0.0003	0.0000	0.1236	-0.0826	0.0109	0.6491	20.7986	20077.2600	0.0000	0.4107	0.1799
China	6.55E-05	0.0000	0.0431	-0.0572	0.0102	-0.3747	6.0978	640.3796	0.0000	0.0991	0.1567
Canada	-0.0003	0.0000	0.0599	-0.079	0.0135	-0.2419	5.1029	293.5376	0.0000	-0.4016	0.2759
Bahrain	-0.0004	0.0000	0.0694	-0.1059	0.0144	-0.6548	11.8930	5093.774	0.0000	-0.5950	0.3138

Table 5.4: Identified ARMA models

S.No	Country	Other country	ARMA(p,q)	Autocorrelation	P-value	ARCH	P-value
1	Canada	China	(1,0)	0.6687	[0.4135]	31.6200	[0.000]
		India	(0,0)	0.6688	[0.4135]	23.7240	[0.000]
		Indonesia	(0,0)	0.5828	[0.4452]	14.8462	[0.000]
		Japan	(1,1)	0.8724	[0.3503]	24.8201	[0.000]
		Kuwait	(1,0)	0.3739	[0.5409]	19.5504	[0.000]
		Malaysia	([5],[5])	0.0981	[0.7541]	14.9296	[0.000]
		Pakistan	(1,0)	0.0335	[0.8549]	18.9354	[0.000]
		Sri Lanka	(1,0)	0.0691	[0.7926]	18.1574	[0.000]
		Turkey	(1,0)	3.3541	[0.0670]	17.0588	[0.000]
		UK	([6],[6])	9.4594	[0.149]	23.5061	[0.000]
		US	(1,0)	0.0004	[0.9836]	13.2709	[0.000]
		Qatar	(1,0)	0.0001	[0.9939]	18.4951	[0.000]
		KSA	([6],[6])	3.0373	[0.0814]	20.2712	[0.000]
		Dubai	([4],[4])	13.9998	[0.0512]	25.0800	[0.000]
		Taiwan	(1,1)	0.4433	[0.5055]	14.4257	[0.000]
		Thailand	([4],[4])	0.3209	[0.5711]	17.6814	[0.000]
2	China	Canada	(1,0)	3.2543	[0.0712]	23.0287	[0.0000]
		India	(1,0)	0.2000	[0.6547]	9.5435	[0.0020]
		Indonesia	(1,0)	0.5601	[0.4542]	15.5857	[0.000]
		Japan	(1,0)	2.0687	[0.1503]	23.4095	[0.000]
		Kuwait	(1,0)	0.6455	[0.4217]	9.2642	[0.0023]
		Malaysia	(1,0)	2.3463	[0.1256]	5.9092	[0.0151]
		Pakistan	(1,0)	0.2886	[0.5911]	9.6189	[0.0019]
		Sri Lanka	(1,0)	1.5136	[0.2186]	14.0900	[0.0002]
		Turkey	(1,0)	3.1218	[0.0773]	9.0018	[0.0027]
		UK	(1,0)	7.5705	[0.056]	17.4095	[0.0000]
		Qatar	(1,0)	0.8764	[0.831]	12.8960	[0.0003]
		KSA	([3],[2])	6.4113	[0.093]	4.5072	[0.0338]
		Dubai	(1,0)	0.0766	[0.7819]	9.3403	[0.0022]
		Taiwan	(1,0)	5.7954	[0.122]	8.3131	[0.0039]
		Thailand	(1,0)	0.6020	[0.4378]	8.2371	[0.0041]
3	India	Canada	(1,0)	0.0450	[0.8320]	22.9652	[0.0000]
		China	([5],0)	3.5632	[0.0591]	29.6126	[0.0000]
		Indonesia	(1,1)	0.0556	[0.8135]	39.7479	[0.0000]
		Japan	([5],0)	1.3503	[0.2452]	15.3726	[0.0000]
		Kuwait	(1,0)	1.2212	[0.2691]	15.8597	[0.0000]
		Malaysia	(1,0)	1.0364	[0.3087]	26.2491	[0.0000]
		Pakistan	(1,0)	3.5880	[0.0582]	14.4736	[0.0001]
		Sri Lanka	([6],1)	1.1085	[0.2924]	14.0836	[0.0002]
		Turkey	(1,0)	1.5450	[0.2139]	13.4380	[0.0002]
		UK	(1,0)	0.1438	[0.7045]	23.5716	[0.0000]
		US	(1,0)	0.1837	[0.6682]	24.5875	[0.0000]
		Qatar	(1,0)	0.1406	[0.7077]	13.4462	[0.0002]
		KSA	(1,0)	3.0939	[0.0786]	8.4208	[0.0037]
		Dubai	(1,0)	0.7014	[0.4023]	19.8116	[0.0000]
		Taiwan	(1,0)	0.7710	[0.3799]	14.4363	[0.0001]
		Thailand	(1,0)	1.8142	[0.1780]	15.4653	[0.0001]
4	Indonesia	Canada	([2],0)	2.8095	[0.0937]	44.8714	[0.0000]
		China	([2],0)	0.6684	[0.4136]	57.9937	[0.0000]
		India	([2],0)	7.4213	[0.115]	27.6045	[0.0000]
		Japan	([2],0)	0.5117	[0.4744]	33.6597	[0.0000]
		Kuwait	([2],0)	11.0100	[0.051]	21.4010	[0.0000]
		Malaysia	([2],0)	0.1795	[0.198]	32.4408	[0.0000]
		Pakistan	([2],0)	0.3563	[0.5506]	29.0216	[0.0000]
		Sri Lanka	([2],0)	0.5757	[0.4480]	26.1540	[0.0000]
		Turkey	([2],0)	1.4481	[0.2288]	37.7037	[0.0000]
		UK	([2],0)	3.3720	[0.0663]	46.5607	[0.0000]
		US	([2],0)	3.1089	[0.0779]	37.5310	[0.0000]
		Qatar	([3],0)	0.5999	[0.4386]	25.0928	[0.0000]

		KSA	([2],0)	0.3167	[0.5736]	25.6348	[0.0000]
		Dubai	([2],0)	0.4199	[0.5170]	26.4963	[0.0000]
		Taiwan	([2],0)	2.5177	[0.1126]	36.4089	[0.0000]
		Thailand	([2],0)	2.1578	[0.1419]	48.4284	[0.0000]
5	Japan	Canada	([6],0)	5.7586	[0.451]	224.6425	[0.0000]
		China	(1,0)	7.6674	[0.263]	236.0180	[0.0000]
		India	([6],0)	9.1455	[0.166]	82.0517	[0.0000]
		Indonesia	([6],0)	9.2813	[0.158]	215.0330	[0.0000]
		Kuwait	(1,0)	0.7332	[0.3919]	190.4604	[0.0000]
		Malaysia	(1,0)	2.1280	[0.1446]	175.4498	[0.0000]
		Pakistan	([6],0)	12.1685	[0.0952]	196.2991	[0.0000]
		Sri Lanka	([6],0)	3.5666	[0.0590]	200.3029	[0.0000]
		Turkey	([6],0)	5.3695	[0.497]	230.7922	[0.0000]
		UK	([6],0)	8.7889	[0.186]	289.4810	[0.0000]
		US	([6],0)	8.3046	[0.217]	269.2646	[0.0000]
		Qatar	([6],0)	3.4950	[0.0616]	204.9669	[0.0000]
		KSA	(1,0)	7.2601	[0.297]	214.3253	[0.0000]
		Dubai	(1,0)	9.4474	[0.2221]	200.2255	[0.0000]
		Taiwan	([6],0)	7.7379	[0.258]	227.3766	[0.0000]
		Thailand	([6],0)	5.9246	[0.432]	240.5541	[0.0000]
6	Kuwait	Canada	([3],0)	0.0149	[0.9028]	49.8880	[0.0000]
		China	([3],0)	0.0109	[0.9168]	55.4344	[0.0000]
		India	([3],0)	0.0042	[0.9484]	55.6380	[0.0000]
		Indonesia	([2],0)	0.0239	[0.8773]	51.1260	[0.0000]
		Japan	([3],0)	0.0108	[0.9171]	49.4391	[0.0000]
		Malaysia	([3],0)	0.0050	[0.9435]	58.0269	[0.0000]
		Pakistan	([2],0)	0.0258	[0.8724]	53.9683	[0.0000]
		Sri Lanka	([2],0)	0.0453	[0.8314]	49.4584	[0.0000]
		Turkey	([3],0)	0.0211	[0.8845]	44.8298	[0.0000]
		UK	([2],0)	0.0001	[0.9909]	48.8648	[0.0000]
		US	([2],0)	0.0487	[0.8253]	48.2613	[0.0000]
		Qatar	([3],0)	0.0243	[0.8761]	48.9605	[0.0000]
		KSA	([3],0)	9.2494	0.1000]	25.4345	[0.0000]
		Dubai	([3],0)	7.7505	[0.257]	82.9373	[0.0000]
		Taiwan	([3],0)	0.0008	[0.9776]	48.6577	[0.0000]
		Thailand	([3],0)	0.0201	[0.8872]	52.0106	[0.0000]
7	Malaysia	Canada	(1,0)	0.1018	[0.7496]	16.2238	[0.0001]
		China	(1,0)	0.5019	[0.4787]	3.8915	[0.0485]
		India	(1,0)	2.3461	[0.1256]	9.3255	[0.0023]
		Indonesia	(1,0)	13.5372	[0.0601]	4.1317	[0.0421]
		Japan	(1,0)	11.5028	[0.1181]	17.3732	[0.0000]
		Kuwait	(1,0)	0.8589	[0.3540]	11.3385	[0.0008]
		Pakistan	(1,0)	1.5523	[0.2128]	11.9340	[0.0006]
		Sri Lanka	(1,0)	12.7996	[0.0771]	16.4705	[0.0000]
		Turkey	(1,0)	2.4698	[0.1160]	14.5340	[0.0001]
		UK	(1,0)	0.0237	[0.8777]	8.6117	[0.0033]
		US	(1,0)	0.7329	[0.3919]	16.5022	[0.0000]
		Qatar	(1,0)	0.1984	[0.6561]	14.7845	[0.0001]
		KSA	(1,0)	10.2280	[0.115]	10.1321	[0.0015]
		Dubai	(1,0)	0.5845	[0.4446]	7.3519	[0.0067]
		Taiwan	([2],0)	1.8993	[0.1682]	12.9454	[0.0003]
		Thailand	(1,0)	2.1726	[0.1405]	6.1387	[0.0132]
8	Pakistan	Canada	(1,0)	3.5844	[0.0583]	319.7261	[0.0000]
		China	(1,0)	7.8529	[0.249]	323.0630	[0.0000]
		India	(1,0)	3.9947	[0.550]	318.9830	[0.0000]
		Indonesia	(1,0)	5.6152	[0.468]	325.6115	[0.0000]
		Japan	(1,0)	1.8877	[0.1695]	321.6533	[0.0000]
		Kuwait	(1,0)	3.7563	[0.0526]	328.7604	[0.0000]
		Malaysia	(1,0)	3.9961	[0.677]	312.1676	[0.0000]
		Sri Lanka	(1,0)	0.8625	[0.3530]	319.3015	[0.0000]
		Turkey	(1,0)	4.3911	[0.624]	314.8730	[0.0000]
		UK	(1,0)	3.9244	[0.687]	311.5992	[0.0000]
		US	(1,0)	1.8461	[0.1742]	321.5036	[0.0000]
		Qatar	([6],0)	0.6871	[0.4071]	319.9835	[0.0000]

		KSA	(1,0)	10.6770	[0.058]	335.8893	[0.0000]
		Dubai	(1,0)	0.5253	[0.4686]	331.6050	[0.0000]
		Taiwan	(1,0)	10.9690	[0.089]	316.1803	[0.0000]
		Thailand	(1,0)	3.0846	[0.0790]	327.0557	[0.0000]
9	Sri Lanka	Canada	(1,0)	12.7669	[0.0780]	87.1373	[0.0000]
		China	(1,0)	13.3017	[0.0651]	83.8121	[0.0000]
		India	(1,0)	13.5927	[0.0589]	86.2950	[0.0000]
		Indonesia	(1,0)	1.5218	[0.2173]	107.7336	[0.0000]
		Japan	(1,0)	1.0864	[0.2973]	105.0148	[0.0000]
		Kuwait	(1,0)	13.2596	[0.0660]	89.4306	[0.0000]
		Malaysia	(1,0)	12.8031	[0.0771]	86.6624	[0.0000]
		Pakistan	(1,0)	13.2133	[0.0671]	86.2395	[0.0000]
		Turkey	(1,0)	13.9438	[0.0522]	89.9606	[0.0000]
		UK	(1,0)	13.6252	[0.0583]	88.0717	[0.0000]
		US	(1,0)	0.0085	[0.9265]	107.0137	[0.0000]
		Qatar	(0,1)	0.4177	[0.5181]	107.2328	[0.0000]
		KSA	(1,0)	11.7456	[0.1092]	87.0486	[0.0000]
		Dubai	(1,0)	13.3417	[0.0642]	85.9284	[0.0000]
		Taiwan	(1,0)	0.6541	[0.4186]	111.3223	[0.0000]
		Thailand	(1,0)	1.0943	[0.2955]	101.9478	[0.0000]
10	Turkey	Canada	(1,1)	10.2140	[0.116]	8.0191	[0.0046]
		China	([2],[2])	9.2689	[0.2339]	7.9646	[0.0048]
		India	([5],[5])	2.6872	[0.1012]	9.0901	[0.0026]
		Indonesia	([5],[5])	10.7881	[0.1481]	8.4901	[0.0036]
		Japan	(1,1)	11.0365	[0.1370]	12.3044	[0.0005]
		Kuwait	(0,0)	2.3265	[0.1272]	18.7779	[0.0000]
		Malaysia	(0,0)	1.7389	[0.1873]	4.1646	[0.0413]
		Pakistan	([3],[3])	1.6048	[0.2052]	13.5902	[0.0000]
		Sri Lanka	([6],[6])	1.3793	[0.2402]	13.7353	[0.0002]
		UK	(1,1)	11.6980	[0.069]	7.4547	[0.0063]
		US	(1,1)	11.3110	[0.1256]	12.7237	[0.0004]
		Qatar	(1,1)	1.2137	[0.2706]	14.7688	[0.0001]
		KSA	(1,1)	3.0366	[0.0814]	15.8347	[0.0001]
		Dubai	([4],0)	3.1301	[0.0769]	14.2679	[0.0002]
		Taiwan	([2],[2])	10.7418	[0.1503]	13.1059	[0.0003]
		Thailand	(0,0)	11.9951	[0.1007]	11.1536	[0.0008]
11	UK	Canada	(0,1)	7.0976	[0.312]	74.3789	[0.0000]
		China	(1,0)	2.9996	[0.809]	79.9516	[0.0000]
		India	(0,0)	0.1712	[0.6790]	101.4089	[0.0000]
		Indonesia	(0,[4])	0.6919	[0.4055]	63.2072	[0.0000]
		Japan	(1,1)	3.2608	[0.0710]	80.2728	[0.0000]
		Kuwait	([6],0)	2.1399	[0.1435]	52.9359	[0.0000]
		Malaysia	(0,[5])	3.6455	[0.0562]	54.4143	[0.0000]
		Pakistan	(0,[4])	2.1325	[0.1442]	54.9285	[0.0000]
		Sri Lanka	([4],[4])	2.8422	[0.0918]	53.3125	[0.0000]
		Turkey	(0,[4])	0.6692	[0.4133]	55.1415	[0.0000]
		US	(1,0)	5.3595	[0.499]	77.3991	[0.0000]
		Qatar	(1,1)	2.9846	[0.0841]	54.0718	[0.0000]
		KSA	([4],0)	0.1577	[0.6913]	49.7243	[0.0000]
		Dubai	([2],0)	0.4553	[0.4998]	53.6637	[0.0000]
		Taiwan	(1,0)	1.0924	[0.982]	54.9219	[0.0000]
		Thailand	(1,1)	0.0001	[0.9925]	88.4872	[0.0000]
12	US	Canada	(1,0)	1.5468	[0.2136]	84.4776	[0.0000]
		China	(1,0)	5.1000	[0.531]	94.6832	[0.0000]
		India	(1,0)	0.0490	[0.8249]	135.3931	[0.0000]
		Indonesia	(1,0)	0.6635	[0.4153]	101.4837	[0.0000]
		Japan	(1,0)	6.0203	[0.421]	82.0236	[0.0000]
		Kuwait	(1,0)	0.1114	[0.7386]	115.5160	[0.0000]
		Malaysia	([3],0)	0.0000	[0.9944]	119.9830	[0.0000]
		Pakistan	([3],0)	0.0045	[0.9467]	107.2140	[0.0000]
		Sri Lanka	([3],0)	0.0584	[0.8090]	105.2410	[0.0000]
		Turkey	(1,0)	1.1412	[0.2854]	82.7560	[0.0000]
		UK	(1,0)	7.3394	[0.197]	158.8959	[0.0000]
		Qatar	([5],0)	0.0277	[0.8678]	105.3451	[0.0000]

		KSA	([3],0)	3.6128	[0.0573]	120.2849	[0.0000]
		Dubai	([3],0)	0.7221	[0.3955]	123.1224	[0.0000]
		Taiwan	(1,0)	8.3852	[0.211]	111.5188	[0.0000]
		Thailand	(1,0)	0.1080	[0.7424]	128.3828	[0.0000]
13	Qatar	Canada	(0,0)	0.1376	[1.000]	8.2552	[0.0041]
		China	(0,0)	0.2274	[1.000]	8.8546	[0.0029]
		India	(0,0)	0.2199	[1.000]	10.0615	[0.0015]
		Indonesia	(0,0)	0.2779	[1.000]	10.0237	[0.0015]
		Japan	(0,0)	0.2289	[1.000]	10.6131	[0.0011]
		Kuwait	(0,0)	0.1292]	[1.000]	4.9887	[0.0255]
		Malaysia	(0,0)	0.1670	[1.000]	8.6842	[0.0032]
		Pakistan	(0,0)	0.3653	[1.000]	9.0317	[0.0027]
		Sri Lanka	(0,0)	0.1998	[1.000]	10.3930	[0.0013]
		Turkey	(0,0)	0.1615	[1.000]	8.5206	[0.0035]
		UK	(0,0)	0.2327	[1.000]	8.2167	[0.0042]
		US	(0,0)	0.1977	[1.000]	8.4927	[0.0036]
		KSA	(0,0)	0.1924	[1.000]	3.3541	[0.0670]
		Dubai	(0,0)	0.3357	[0.997]	0.3084	[0.5787]
		Taiwan	(0,0)	0.1644	[1.000]	9.3215	[0.0023]
		Thailand	(0,0)	0.2434	[1.000]	8.9595	[0.0028]
14	KSA	Canada	(1,0)	9.5968	[0.087]	88.9292	[0.0000]
		China	(1,0)	0.0077	[0.9299]	93.1045	[0.0000]
		India	(1,0)	0.0297	[0.8633]	87.1414	[0.0000]
		Indonesia	(1,0)	2.0196	[0.1553]	100.2688	[0.0000]
		Japan	(1,0)	2.6572	[0.1031]	107.0256	[0.0000]
		Kuwait	(1,0)	0.4905	[0.4837]	83.1150	[0.0000]
		Malaysia	(1,0)	0.0856	[0.7698]	85.0717	[0.0000]
		Pakistan	(1,0)	0.0858	[0.7695]	106.0941	[0.0000]
		Sri Lanka	(1,0)	0.3662	[0.5451]	110.9589	[0.0000]
		Turkey	(1,0)	0.3897	[0.5325]	102.7462	[0.0000]
		UK	(1,0)	0.2969	[0.586]	96.9842	[0.0000]
		US	(1,0)	0.1987	[0.656]	92.2381	[0.0000]
		Qatar	(1,0)	0.0627	[0.8024]	113.4556	[0.0000]
		Dubai	(1,0)	2.1868	[0.1392]	60.7243	[0.0000]
		Taiwan	(1,0)	0.0312	[0.8598]	122.3852	[0.0000]
		Thailand	(1,0)	0.9326	[0.3342]	75.0034	[0.0000]
15	Dubai	Canada	(1,0)	0.1205	[0.7285]	23.3423	[0.0000]
		China	(1,0)	0.0054	[0.9414]	20.3792	[0.0000]
		India	(1,0)	0.8592	[0.3540]	20.3606	[0.0000]
		Indonesia	(1,0)	1.0682	[0.3014]	19.6846	[0.0000]
		Japan	(1,0)	0.3898	[0.5324]	24.1111	[0.0000]
		Kuwait	(1,0)	1.8216	[0.1771]	113.7682	[0.0000]
		Malaysia	(1,0)	0.4667	[0.4945]	24.1919	[0.0000]
		Pakistan	(1,0)	0.7859	[0.3753]	21.5432	[0.0000]
		Sri Lanka	(1,0)	1.0084	[0.3153]	21.0741	[0.0000]
		Turkey	(1,0)	0.1935	[0.6600]	24.0170	[0.0000]
		UK	(1,0)	0.0003	[0.9860]	21.0382	[0.0000]
		US	(1,0)	0.0107	[0.9177]	22.9032	[0.0000]
		Qatar					
		KSA	(1,0)	3.1121	[0.0777]	18.0525	[0.0000]
		Taiwan	(1,0)	0.0658	[0.7976]	22.6758	[0.0000]
		Thailand	(1,0)	0.2597	[0.6103]	20.7341	[0.0000]
16	Taiwan	Canada	(0,1)	11.5920	[0.072]	17.1413	[0.0000]
		China	(1,0)	2.1589	[0.142]	23.1837	[0.0000]
		India	([2],0)	11.8600	[0.127]	16.2940	[0.0001]
		Indonesia	(0,[2])	1.9149	[0.1664]	16.0362	[0.0000]
		Japan	(0,[2])	1.1198	[0.2900]	38.0757	[0.0000]
		Kuwait	([2],0)	0.4838	[0.4867]	29.7299	[0.0000]
		Malaysia	(0,[2])	2.0729	[0.1499]	18.3999	[0.0000]
		Pakistan	(0,[2])	0.2725	[0.6017]	24.5437	[0.0000]
		Sri Lanka	(0,[2])	1.0109	[0.3147]	36.7392	[0.0000]
		Turkey	(0,[2])	0.0173	[0.8953]	20.8723	[0.0000]
		UK	(0,1)	11.7760	[0.067]	21.1752	[0.0000]
		US					

		Qatar	(0,[4])	0.9420	[0.3318]	38.3591	[0.0000]
		KSA	(0,[4])	0.0002	[0.9880]	17.5089	[0.0000]
		Dubai	([2],0)	0.0748	[0.7845]	26.3650	[0.0000]
		Thailand	(1,0)	2.3458	[0.1256]	12.1448	[0.0000]
17	Thailand	Canada	([6],0)	8.5270	[0.202]	30.2774	[0.0000]
		China	([5],0)	11.3240	[0.079]	15.9772	[0.0000]
		India	([6],0)	0.5826	[0.4453]	35.4624	[0.0000]
		Indonesia	([6],0)	3.0760	[0.0795]	32.2597	[0.0000]
		Japan	([5],0)	0.4730	[0.4916]	39.1416	[0.0000]
		Kuwait	([5],0)	0.0001	[0.9941]	41.0749	[0.0000]
		Malaysia	(0,([5])	3.3498	[0.0672]	12.6630	[0.0000]
		Pakistan	([5],0)	0.0408	[0.8400]	31.2940	[0.0000]
		Sri Lanka	([5],0)	0.1701	[0.6800]	41.3222	[0.0000]
		Turkey	([5],0)	0.5926	[0.4414]	38.1431	[0.0000]
		UK	([5],0)	1.7665	[0.1838]	36.0630	[0.0000]
		US	([5],0)	10.5390	[0.104]	40.8010	[0.0000]
		Qatar	([5],0)	0.2362	[0.6270]	39.0402	[0.0000]
		KSA	([5],0)	0.4240	[0.5150]	41.4376	[0.0000]
		Dubai	([5],0)	0.0270	[0.8695]	48.2646	[0.0000]
		Taiwan	([6],0)	9.7283	[0.137]	34.2135	[0.0000]
18	Bahrain	Canada	(1,0)	0.1225	[0.726]	42.7692	[0.0000]
		China	(1,0)	0.1892	[0.664]	42.1807	[0.0000]
		India	(1,0)	0.1258	[0.723]	44.1193	[0.0000]
		Indonesia	(1,0)	0.1058	[0.745]	44.7960	[0.0000]
		Japan	(1,0)	0.0969	[0.756]	44.3062	[0.0000]
		Kuwait	(1,0)	0.0930	[0.760]	44.2582	[0.0000]
		Malaysia	(1,0)	0.1348	[0.713]	43.2587	[0.0000]
		Pakistan	(1,0)	0.1358	[0.712]	43.6527	[0.0000]
		Sri Lanka	(1,0)	0.0614	[0.804]	44.1176	[0.0000]
		Turkey	(1,0)	0.1269	[0.722]	43.5980	[0.0000]
		UK	(1,0)	0.0895	[0.765]	44.5361	[0.0000]
		US	(1,0)	0.1047	[0.746]	46.8131	[0.0000]
		Qatar	(1,0)	0.1232	[0.1232]	44.5421	[0.0000]
		KSA	(1,0)	0.0939	[0.759]	44.5507	[0.0000]
		Dubai	(1,0)	0.1069	[0.744]	43.8121	[0.0000]
		Taiwan	(1,0)	0.1543	[0.694]	45.4868	[0.0000]
		Thailand	(1,0)	0.0860	[0.769]	45.9439	[0.0000]

Appendix C

Post Estimation results for Bivariate Analysis

Table 5.41: Results of ARCH effect of Canada with Other Countries

		China	India	Indonesia	Japan	Kuwait	Malaysia	Pakistan	Sri-Lanka	Turkey	UK	US	Qatar	KSA	Dubai	Taiwan	Thailand	Bahrain
ARCH Test	F-stat	0.5570 (0.4556)	0.2776 (0.5983)	0.1037 (0.7474)	0.6141 (0.4334)	0.3165 (0.5738)	0.1977 (0.6567)	0.1709 (0.6794)	0.0718 (0.7887)	0.2893 (0.5907)	1.0395 (0.3081)	1.0709 (0.3009)	0.2892 (0.5908)	0.1556 (0.6933)	0.3584 (0.5495)	0.0005 (0.9818)	0.5888 (0.4430)	0.2185 (0.6403)
	Obs*R-squared	0.5575 (0.4553)	0.2776 (0.5981)	0.1039 (0.7472)	0.6146 (0.4330)	0.3169 (0.5735)	0.1979 (0.6564)	0.1711 (0.6791)	0.0719 (0.7886)	0.2897 (0.5904)	1.0402 (0.3078)	1.0716 (0.3006)	0.2895 (0.5905)	0.1558 (0.6931)	0.3588 (0.5492)	0.0005 (0.9818)	0.5893 (0.4427)	0.2187 (0.6400)

Table 5.42: Results of ARCH effect of China with Other Countries

		Canada	India	Indonesia	Japan	Kuwait	Malaysia	Pakistan	Sri-Lanka	Turkey	UK	US	Qatar	KSA	Dubai	Taiwan	Thailand	Bahrain
ARCH Test	F-stat	0.3934 (0.5306)	2.5941 (0.1075)	0.5500 (0.4584)	0.39623 (0.5291)	3.4055 (0.0652)	2.4949 (0.1144)	2.5821 (0.1083)	2.0317 (0.1542)	3.4128 (0.0649)	0.6712 (0.4127)	0.2911 (0.5896)	2.0770 (0.1497)	3.75323 (0.0529)	1.7186 (0.1901)	0.19909 (0.6555)	0.5368 (0.4639)	1.9320 (0.1647)
	Obs*R-squared	0.3938 (0.5303)	2.5931 (0.1073)	0.5505 (0.4581)	0.39665 (0.5288)	3.4023 (0.0651)	2.4941 (0.1143)	2.5811 (0.1081)	2.0317 (0.1540)	3.4096 (0.0648)	0.6718 (0.4124)	0.2914 (0.5893)	2.0769 (0.1495)	3.74888 (0.0528)	1.7190 (0.1898)	0.19933 (0.6553)	0.5373 (0.4635)	1.9321 (0.1645)

Table 5.43: Results of ARCH effect of India with Other Countries

		Canada	china	Indonesia	Japan	Kuwait	Malaysia	Pakistan	Sri-Lanka	Turkey	UK	US	Qatar	KSA	Dubai	Taiwan	Thailand	Bahrain
ARCH Test	F-stat	0.0474 (0.8277)	0.2278 (0.6332)	0.8672 (0.3519)	0.2391 (0.6249)	0.2172 (0.6412)	0.0388 (0.8439)	0.4968 (0.4810)	0.4288 (0.5127)	0.0140 (0.9061)	0.0238 (0.8774)	0.0051 (0.9429)	0.4336 (0.5104)	1.2722 (0.2595)	0.1389 (0.7094)	0.0653 (0.7983)	0.6812 (0.4093)	0.4696 (0.4933)
	Obs*R-squared	0.0474 (0.8275)	0.2281 (0.6329)	0.8679 (0.3515)	0.2393 (0.6247)	0.2175 (0.6410)	0.0389 (0.8437)	0.4973 (0.4807)	0.4293 (0.5123)	0.0140 (0.9061)	0.0238 (0.8773)	0.0051 (0.9429)	0.4339 (0.5101)	1.2728 (0.2592)	0.1391 (0.7092)	0.0654 (0.7981)	0.6818 (0.4090)	(0.4700) 0.4929

Table 5.44: Results of ARCH effect of Indonesia with Other Countries

		Canada	China	India	Japan	Kuwait	Malaysia	Pakistan	Sri-Lanka	Turkey	UK	US	Qatar	KSA	Dubai	Taiwan	Thailand	Bahrain
ARCH Test	F-stat	0.7295 (0.3932)	1.9926 (0.1583)	0.2189 (0.6400)	1.2726 (0.2595)	0.4757 (0.4905)	1.1761 (0.2783)	0.9866 (0.3207)	0.6277 (0.4283)	1.6428 (0.2001)	1.7841 (0.1818)	1.0644 (0.3024)	1.0087 (0.3154)	0.6826 (0.4088)	0.1325 (0.7159)	1.5212 (0.2176)	0.8383 (0.3600)	0.3949 (0.5298)
	Obs*R-squared	0.7301 (0.3928)	1.9926 (0.1581)	0.2191 (0.6397)	1.2732 (0.2592)	0.4762 (0.4902)	1.1767 (0.2780)	0.9872 (0.3204)	0.6283 (0.4280)	1.64327 (0.1999)	1.7843 (0.1816)	1.06503 (0.3021)	1.0094 (0.3150)	0.68326 (0.4085)	0.1327 (0.7156)	1.5217 (0.2174)	0.8390 (0.3597)	0.3953 (0.5295)

Table 5.45: Results of ARCH effect of Japan with Other Countries

		Canada	China	India	Indonesia	Kuwait	Malaysia	Pakistan	Sri-Lanka	Turkey	UK	US	Qatar	KSA	Dubai	Taiwan	Thailand	Bahrain
ARCH Test	F-stat	3.3398 (0.0678)	3.1846 (0.0745)	3.4891 (0.0620)	3.1888 (0.0743)	1.2284 (0.2679)	2.5390 (0.1113)	3.0270 (0.0821)	3.0268 (0.0821)	3.327 (0.0683)	3.0512 (0.0809)	2.8562 (0.0912)	4.2172 (0.0402)	1.0871 (0.2973)	3.2267 (0.0726)	2.9664 (0.0852)	2.7686 (0.0963)	2.7380 (0.0982)
	Obs*R-squared	3.3368 (0.0677)	3.1821 (0.0744)	3.4857 (0.0619)	3.1863 (0.0743)	1.2290 (0.2676)	2.53811 (0.1111)	3.0249 (0.0820)	3.0247 (0.0820)	3.3244 (0.0683)	3.04912 (0.0808)	2.8545 (0.0911)	4.2110 (0.0402)	1.0877 (0.2970)	3.2241 (0.0726)	2.9645 (0.0851)	2.76717 (0.0962)	2.7366 (0.0981)

Table 5.46: Results of ARCH effect of Kuwait with Other Countries

		Canada	China	India	Indonesia	Japan	Malaysia	Pakistan	Sri-Lanka	Turkey	UK	US	Qatar	KSA	Dubai	Taiwan	Thailand	Bahrain
ARCH Test	F-stat	0.1745 (0.6762)	0.0532 (0.8176)	0.1528 (0.6959)	0.1160 (0.7335)	0.1000 (0.7518)	0.1953 (0.6586)	0.2760 (0.5994)	0.1689 (0.6811)	0.1741 (0.6765)	0.4255 (0.5143)	0.1252 (0.7235)	2.0104 (0.1564)	3.5276 (0.0605)	1.4656 (0.2262)	0.1353 (0.7130)	0.0016 (0.9680)	0.0787 (0.7791)
	Obs*R-squared	0.1746 (0.6760)	0.0533 (0.8174)	0.1530 (0.6957)	0.1161 (0.7332)	0.1001 (0.7516)	0.1955 (0.6583)	0.2763 (0.5991)	0.1691 (0.6809)	0.1743 (0.6763)	0.4259 (0.5140)	0.1253 (0.7233)	2.0103 (0.1562)	3.5240 (0.0605)	1.4661 (0.2260)	0.1355 (0.7128)	0.0016 (0.9679)	0.0788 (0.7789)

Table 5.47: Results of ARCH effect of Malaysia with Other Countries

		Canada	China	India	Indonesia	Japan	Kuwait	Pakistan	Sri-Lanka	Turkey	UK	US	Qatar	KSA	Dubai	Taiwan	Thailand	Bahrain
ARCH Test	F-stat	0.0004 (0.9842)	0.0116 (0.9141)	0.1237 (0.7250)	0.5210 (0.4705)	0.2815 (0.5957)	0.0413 (0.8389)	0.0133 (0.9082)	0.2084 (0.6481)	0.0184 (0.8922)	0.0303 (0.8619)	0.0172 (0.8957)	5.86E-06 (0.9981)	0.0255 (0.8731)	0.0900 (0.7642)	0.0443 (0.8332)	0.0572 (0.8109)	0.0154 (0.9013)
	Obs*R-squared	0.00039 (0.9842)	0.0116 (0.9140)	0.1239 (0.7248)	0.5215 (0.4702)	0.2819 (0.5955)	0.04137 (0.8388)	0.0133 (0.9081)	0.2087 (0.6478)	0.0184 (0.8921)	0.0303 ()0.8618	0.0172 (0.8956)	5.87E-06 (0,9981)	0.0256 (0.8730)	0.0901 (0.7640)	0.0444 (0.8331)	0.0573 (0.8108)	0.0153 (0.9013)

Table 5.48: Results of ARCH effect of Pakistan with Other Countries

		Canada	China	India	Indonesia	Japan	Kuwait	Pakistan	Sri-Lanka	Turkey	UK	US	Qatar	KSA	Dubai	Taiwan	Thailand	Bahrain
ARCH Test	F-stat	2.2210 (0.1364)	1.6698 (0.1965)	1.8354 (0.1757)	1.7649 (0.1842)	1.8007 (0.1798)	0.3718 (0.5421)	2.6132 (0.1062)	1.6019 (0.2058)	1.62353 (0.2028)	1.5655 (0.2110)	1.7218 (0.1897)	2.8306 (0.0927)	3.0511 (0.0809)	1.4610 (0.2270)	1.7862 (0.1816)	3.181764 (0.0747)	1.9897 (0.1586)
	Obs*R-squared	2.2207 (0.1362)	1.6702 (0.1962)	1.8357 (0.1755)	1.7652 (0.1840)	1.8009 (0.1796)	0.3722 (0.5418)	2.6122 (0.1060)	1.6023 (0.2056)	1.62394 0 (0.2025)	1.5660 (0.2108)	1.7221 (0.1894)	2.8291 (0.0926)	3.0489 (0.0808)	1.4615 (0.2267)	1.7865 (0.1814)	3.179278 (0.0746)	1.9896 (0.1584)

Table 5.49: Results of ARCH effect of SriLanka with Other Countries

		Canada	China	India	Indonesia	Japan	Kuwait	Malaysia	Pakistan	Turkey	UK	US	Qatar	KSA	Dubai	Taiwan	Thailand	Bahrain
ARCH Test	F-stat	0.1685 (0.6815)	0.0086 (0.9262)	0.0149 (0.9029)	4.90E-05 (0.9944)	0.0078 (0.9295)	0.0263 (0.8711)	0.0027 (0.9586)	0.0162 (0.8988)	0.0106 (0.9178)	0.0258 (0.8723)	0.0165 (0.8977)	0.0001 (0.9905)	0.0352 (0.8512)	0.0132 (0.9085)	0.0456 (0.8310)	0.0806 (0.7765)	0.0024 (0.9609)
	Obs*R-squared	0.1687 (0.6812)	0.0086 (0.9262)	0.0149 (0.9028)	4.90E-05 (0.9944)	0.0078 (0.9295)	0.0263 (0.8710)	0.0027 (0.9586)	0.0162 (0.8987)	0.0107 (0.9177)	0.0259 (0.8722)	0.0165 (0.8976)	0.0001 (0.9905)	0.0352 (0.8510)	0.0132 (0.9085)	0.0456 (0.8308)	0.0807 (0.7763)	0.0024 (0.9608)

Table 5.50: Results of ARCH effect of Turkey with Other Countries

		Canada	China	India	Indonesia	Japan	Kuwait	Malaysia	Pakistan	Sri-Lanka	UK	US	Qatar	KSA	Dubai	Taiwan	Thailand	Bahrain
ARCH Test	F-stat	0.3165 (0.5738)	0.3071 (0.5796)	0.3252 (0.5686)	0.2766 (0.5990)	0.3145 (0.5750)	0.1195 (0.7296)	0.1406 (0.7077)	0.1934 (0.6602)	0.0947 (0.7583)	0.2407 (0.6238)	0.1452 (0.7032)	0.2211 (0.6383)	0.1997 (0.6550)	0.9378 (0.3330)	0.0900 (0.7642)	0.0322 (0.8575)	0.1177 (0.7316)
	Obs*R-squared	0.3169 (0.5735)	0.3074 (0.5793)	0.3256 (0.5683)	0.2769 (0.5987)	0.3149 (0.5747)	0.1197 (0.7294)	0.1408 (0.7075)	0.1936 (0.6599)	0.0948 (0.7581)	0.2409 (0.6235)	0.1454 (0.7029)	0.2213 (0.6380	0.1999 (0.6548)	0.9384 (0.3327)	0.0901 (0.7641)	0.032273 (0.8574)	0.1178 (0.7314)

Table 5.51: Results of ARCH effect of UK with Other Countries

		Canada	China	India	Indonesia	Japan	Kuwait	Malaysia	Pakistan	Sri-Lanka	Turkey	US	Qatar	KSA	Dubai	Taiwan	Thailand	Bahrain
ARCH Test	F-stat	0.0585 (0.8089)	0.1424 (0.7060)	0.0530 (0.8180)	0.0008 (0.9771)	1.6773 (0.1955)	0.7178 (0.3970)	0.2255 (0.6349)	0.1281 (0.7205)	0.0885 (0.7661)	0.0240 (0.8767)	0.0199 (0.8879)	0.0208 (0.8852)	0.0017 (0.9672)	1.7209 (0.1898)	0.0429 (0.8360)	0.2107 (0.6463)	0.3336 (0.5636)
	Obs*R-squared	0.0586 (0.8088)	0.1426 (0.7057)	0.0530 (0.8178)	0.0008 (0.9771)	1.6776 (0.1952)	0.7184 (0.3967)	0.2258 (0.6346)	0.1282 (0.7202)	0.0887 (0.7659)	0.0241 (0.8766)	0.0199 (0.8878)	0.0209 (0.8851)	0.0017 (0.9672)	1.7212. (0.1895)	0.0429 (0.8358)	0.2110 (0.6460)	0.3339 (0.5633)

Table 5.52: Results of ARCH effect of US with Other Countries

		Canada	China	India	Indonesia	Japan	Kuwait	Malaysia	Pakistan	Sri-Lanka	Turkey	UK	Qatar	KSA	Dubai	Taiwan	Thailand	Bahrain
ARCH Test	F-stat	0.1749 (0.6758)	0.8796 (0.3485)	0.4441 (0.5053)	0.0406 (0.8402)	0.0438 (0.8342)	0.0163 (0.8984)	0.7117 (0.3990)	0.0904 (0.7637)	1.4657 (0.2262)	0.1038 (0.7474)	1.7300 (0.1886)	0.0242 (0.8763)	0.0214 (0.8838)	0.0530 (0.8178)	0.1240 (0.7247)	0.0006 (0.9811)	0.0897 (0.7646)
	Obs*R-squared	0.1751 (0.6756)	0.8802 (0.3481)	0.4445 (0.5049)	0.0407 (0.8401)	0.0439 (0.8340)	0.0163 (0.8983)	0.7123 (0.3987)	0.0905 (0.7635)	1.4662 (0.2259)	0.1039 (0.7472)	1.7303 (0.1884)	0.0242 (0.8762)	0.0214 (0.8837)	0.0531 (0.8177)	0.1242 (0.7245)	0.0006 (0.9811)	0.0897 (0.7644)

Table 5.53: Results of ARCH effect of Qatar with Other Countries

		Canada	China	India	Indonesia	Japan	Kuwait	Malaysia	Pakistan	Sri-Lanka	Turkey	UK	US	KSA	Dubai	Taiwan	Thailand	Bahrain
ARCH Test	F-stat	1.9743 (0.1602)	2.5660 (0.094)	2.0208 (0.1554)	2.2339 (0.1116)	3.1416 (0.0765)	2.6640 (0.1029)	3.6371 (0.0567)	2.6775 (0.1020)	2.4366 (0.1187)	1.9881 (0.1587)	2.3784 (0.1232)	2.0541 (0.1520)	0.0974 (0.7550)	1.7109 (0.1911)	2.5787 (0.1085)	2.8089 (0.0939)	2.2133 (0.1370)
	Obs*R-squared	1.9744 (0.1600)	2.5651 (0.1092)	2.0208 (0.15520	2.5330 (0.1115)	3.1392 (0.0764)	2.6628 (0.1027)	3.6332 (0.0566)	2.6763 (0.1019)	2.4359 (0.1186)	1.9881 (0.1585)	2.3778 (0.1231)	2.0540 (0.1518)	0.0975 (0.7548)	1.7112 (0.1908)	2.5776 (0.1084)	2.8074 (0.0938)	2.2130 (0.1369)

Table 5.54: Results of ARCH effect of KSA with Other Countries

		Canada	China	India	Indonesia	Japan	Kuwait	Malaysia	Pakistan	Sri-Lanka	Turkey	UK	US	Qatar	Dubai	Taiwan	Thailand	Bahrain
ARCH Test	F-stat	0.0050 (0.9436)	0.0291 (0.8646)	0.0531 (0.8178)	0.1538 (0.6950)	0.0357 (0.8501)	0.0288 (0.8653)	0.0299 (0.8627)	0.0258 (0.8725)	0.0178 (0.8938)	0.0086 (0.9261)	0.7902 (0.3742)	0.0022 (0.9628)	0.3635 (0.5466)	0.0449 (0.8322)	7.05E-06 (0.9979)	0.0518 (0.8200)	1.3856 (0.2393)
	Obs*R-squared	0.0050 (0.9435)	0.0291 (0.8645)	0.0531 (0.8176)	0.1540 (0.6948)	0.0358 (0.8500)	0.0288 (0.8652)	0.0299 (0.8626)	0.0258 (0.8724)	0.0179 (0.8937)	0.0086 (0.9260)	0.7908 (0.3738)	0.0022 (0.9628)	0.3639 (0.5463)	0.0449 (0.8321)	7.06E-06 (0.9979)	0.0519 (0.8198)	1.3862 (0.2390)

Table 5.55: Results of ARCH effect of Dubai with Other Countries

		Canada	China	India	Indonesia	Japan	Kuwait	Malaysia	Pakistan	Sri-Lanka	Turkey	UK	US	Qatar	KSA	Taiwan	Thailand	Bahrain
ARCH Test	F-stat	1.5817 (0.2087)	1.6328 (0.2015)	1.2154 (0.2704)	1.5706 (0.2103)	1.0619 (0.3029)	0.1286 (0.7199)	1.3952 (0.2377)	0.8458 (0.3579)	1.3737 (0.2414)	1.5658 (0.2110)	1.5486 (0.2135)	1.4484 (0.2290)		0.2325 (0.6297)	1.4894 (0.2225)	2.1322 (0.1444)	1.5003 (0.2208)
	Obs*R-squared	1.5822 (0.2084)	1.6332 (0.2013)	1.2160 (0.2701)	1.5711 (0.2100)	1.0626 (0.3026)	0.1288 (0.7197)	1.3957 (0.2374)	0.8464 (0.3576)	1.3743 (0.2411)	1.5662 (0.2108)	1.5490 (0.2133)	1.4489 (0.2287)		0.2328 (0.6294)	1.4899 (0.2222)	2.1320 (0.1442)	1.5008 (0.2205)

Table 5.56: Results of ARCH effect of Taiwan with Other Countries

		Canada	China	India	Indonesia	Japan	Kuwait	Malaysia	Pakistan	Sri-Lanka	Turkey	UK	US	Qatar	KSA	Dubai	Thailand	Bahrain
ARCH Test	F-stat	0.0482 (0.8262)	0.1364 (0.7119)	0.1189 (0.7302)	0.0278 (0.8675)	0.4231 (0.5155)	0.0219 (0.8822)	0.0045 (0.9463)	0.0594 (0.8074)	0.2400 (0.6242)	0.0580 (0.8097)	0.0757 (0.7833)		0.3299 (0.5658)	0.1740 (0.6767)	0.0864 (0.7689)	0.2426 (0.6224)	0.3481 (0.5553)
	Obs*R-squared	0.0483 (0.8260)	0.1366 (0.7117)	0.1190 (0.7300)	0.0279 (0.8674)	0.4235 (0.5152)	0.0219 (0.8821)	0.0045 (0.9462)	0.0595 (0.8072)	0.2403 (0.6240)	0.0580 (0.8095)	0.0757 (0.7831)		0.3302 (0.5655)	0.1742 (0.6764)	0.0865 (0.7687)	0.2429 (0.6221)	0.3484 (0.5550)

Table 5.57: Results of ARCH effect of Thailand with Other Countries

		Canada	China	India	Indonesia	Japan	Kuwait	Malaysia	Pakistan	Sri-Lanka	Turkey	UK	US	Qatar	KSA	Dubai	Taiwan	Bahrain
ARCH Test	F-stat	0.4430 (0.5058)	0.4204 (0.5169)	0.0214 (0.8836)	0.4201 (0.5170)	0.8179 (0.3659)	0.8201 (0.3653)	1.9000 (0.1683)	0.9933 (0.3191)	0.7657 (0.3817)	0.6468 (0.4214)	0.0004 (0.9846)	0.5044 (0.4777)	0.6414 (0.4233)	0.7785 (0.3777)	0.1814 (0.6702)	0.5046 (0.4776)	0.8654 (0.3524)
	Obs*R-squared	0.4434 (0.5055)	0.4208 (0.5165)	0.0214 (0.8835)	0.4205 (0.5167)	0.8185 (0.3656)	0.8207 (0.3650)	1.9001 (0.1681)	0.9940 (0.3188)	0.7663 (0.3814)	0.6473 (0.4211)	0.0004 (0.9846)	0.5049 (0.4774)	0.64200 (0.4230)	0.7792 (0.3774)	0.1816 (0.6700)	0.5051 (0.4773)	0.8660 (0.3521)

Table 5.58: Results of ARCH effect of Bahrain with Other Countries

		Canada	China	India	Indonesia	Japan	Kuwait	Malaysia	Pakistan	Sri-Lanka	Turkey	UK	US	Qatar	KSA	Dubai	Taiwan	Thailand
ARCH Test	F-stat	0.5425 (0.4615)	0.5037 (0.4780)	0.4845 (0.4865)	0.5401 (0.4625)	0.5640 (0.4528)	0.5471 (0.4596)	0.5766 (0.4478)	0.5988 (0.4391)	0.5476 (0.4594)	3.6102 (0.0576)	0.6730 (0.4121)	0.0248 (0.8749)	0.5208 (0.4706)	0.5247 (0.4689)	0.5603 (0.4542)	0.4261 (0.5140)	0.4936 (0.4824)
	Obs*R-squared	0.5431 (0.4612)	0.5042 (0.4777)	0.4850 (0.4862)	0.5407 (0.4622)	0.5645 (0.4524)	0.5476 (0.4593)	0.5771 (0.4474)	0.5993 (0.4388)	0.5481 (0.4591)	3.6063 (0.0576)	0.6736 (0.4118)	0.0248 (0.8748)	0.5213 (0.4703)	0.5253 (0.4686)	0.5609 (0.4539)	0.4266 (0.5137)	0.4941 (0.4821)

Post Estimation results for Asymmetric Analysis

Table 5.59: Results of ARCH effect of Canada with Other Countries

		China	India	Indonesia	Japan	Kuwait	Malaysia	Pakistan	Sri-Lanka	Turkey	UK	US	Qatar	KSA	Dubai	Taiwan	Thailand	Bahrain
ARCH Test	F-stat	0.4848 (0.4863)	0.1070 (0.7436)	0.0996 (0.7524)	0.3298 (0.5659)	0.1096 (0.7406)	0.03315 (0.8556)	0.0335 (0.8547)	0.0012 (0.9723)	0.2612 (0.6094)	0.6780 (0.4104)	0.0995 (0.7525)	0.2654 (0.6065)	0.1337 (0.7146)	0.1703 (0.6799)	0.0008 (0.9778)	1.0449 (0.3068)	0.0680 (0.7943)
	Obs*R-squared	0.4853 (0.4860)	0.1071 (0.7434)	0.0997 (0.7522)	0.33014 (0.5656)	0.1097 (0.7404)	0.0331 (0.8554)	0.0336 (0.8546)	0.0012 (0.9723)	0.2615 (0.6094)	0.6786 (0.4101)	0.0996 (0.7523)	0.2357 (0.6062)	0.1339 (0.7144)	0.1705 (0.6796)	0.0008 (0.9778)	1.0456 (0.3065)	0.0681 (0.7941)

Table 5.60: Results of ARCH effect of China with Other Countries

		Canada	India	Indonesia	Japan	Kuwait	Malaysia	Pakistan	Sri-Lanka	Turkey	UK	US	Qatar	KSA	Dubai	Taiwan	Thailand	Bahrain
ARCH Test	F-stat	0.1140 (0.7357)	1.7749 (0.1830)	0.2508 (0.6166)	1.7825 (0.1820)	1.5338 (0.2157)	0.2693 (0.6039)	2.2655 (0.1325)	1.8605 (0.1728)	2.2642 (0.1326)	0.0072 (0.9321)	1.2862 (0.2569)	1.6067 (0.2051)	3.0489 (0.0810)	1.1047 (0.2934)	0.0095 (0.9223)	0.066829 (0.7960)	1.968 (0.1609)
	Obs*R-squared	0.1141 (0.7355)	1.7751 (0.1827)	0.2511 (0.6163)	1.7828 (0.1818)	1.5343 (0.2155)	0.2696 (0.6036)	2.2651 (0.1323)	1.8607 (0.1725)	2.2638 (0.1324)	0.0073 (0.9321)	1.2868 (0.2566)	1.6071 (0.2049)	3.0468 (0.0809)	1.1054 (0.2931)	0.0095 (0.9223)	0.0669 (0.7959)	1.9681 (0.1609)

Table 5.61: Results of ARCH effect of India with Other Countries

		Canada	China	Indonesia	Japan	Kuwait	Malaysia	Pakistan	Sri-Lanka	Turkey	UK	US	Qatar	KSA	Dubai	Taiwan	Thailand	Bahrain
ARCH Test	F-stat	0.4793 (0.4889)	0.0238 (0.8774)	0.0005 (0.9820)	0.2175 (0.6410)	1.0076 ()0.3156	0.4486 (0.5031)	0.5111 (0.4747)	0.1443 (0.7041)	0.7723 (0.3797)	1.2602 (0.2618)	2.2508 (0.1338)	0.6631 (0.4156)	0.0105 (0.9182)	0.3905 (0.5321)	0.8185 (0.3658)	0.0026 (0.9596)	0.6998 (0.4030)
	Obs*R-squared	0.4798 (0.4885)	0.0238 (0.8773)	0.0005 (0.9820)	0.2177 (0.6407)	1.0083 (0.3153)	0.4490 (0.5028)	0.5116 (0.4744)	0.1444 (0.7039)	0.7729 (0.3793)	1.2608 (0.2615)	2.2504 (0.1336)	0.6637 (0.4152)	0.0106 (0.9181)	0.3909 (0.5318)	0.8191 (0.3654)	0.0026 (0.9596)	0.7004 (0.4026)

Table 5.62: Results of ARCH effect of Indonesia with Other Countries

		Canada	China	India	Japan	Kuwait	Malaysia	Pakistan	Sri-Lanka	Turkey	UK	US	Qatar	KSA	Dubai	Taiwan	Thailand	Bahrain
ARCH Test	F-stat	0.6655 (0.4147)	3.1640 (0.0755)	0.3098 (0.5779)	2.2797 (0.1313)	0.3442 (0.5575)	0.9398 (0.3325)	0.8600 (0.3539)	0.5846 (0.4446)	2.2239 (0.1361)	1.8632 (0.1725)	1.1029 (0.2938)	0.4861 (0.4858)	0.6734 (0.4120)	0.6027 (0.4377)	1.9836 (0.1592)	1.5880 (0.2078)	0.5894 (0.4427)
	Obs*R-squared	0.6661 (0.4144)	3.1615 (0.0754)	0.3101 (0.5776)	2.2792 (0.1311)	0.3446 (0.5572)	0.9404 (0.3322)	0.8606 (0.3536)	0.5852 (0.4443)	2.2236 (0.1359)	1.8634 (0.1722)	1.1035 (0.2935)	0.4866 (0.4854)	0.6740 (0.4117)	0.6032 (0.4373)	1.9837 (0.1590)	1.5884 (0.207)	0.5900 (0.4424)

Table 5.63: Results of ARCH effect of Japan with Other Countries

		Canada	China	India	Indonesia	Kuwait	Malaysia	Pakistan	Sri-Lanka	Turkey	UK	US	Qatar	KSA	Dubai	Taiwan	Thailand	Bahrain
ARCH Test	F-stat	1.4328 (0.2315)	0.3837 (0.5357)	0.8010 (0.3709)	1.0061 (0.3160)	0.0401 (0.8413)	0.4804 (0.4883)	1.0411 (0.3077)	1.3023 (0.2540)	1.0749 (0.3000)	1.4748 (0.2248)	4.4056 (0.0360)	1.0756 (0.2999)	0.2120 (0.6453)	0.5477 (0.4594)	1.7851 (0.1817)	0.6937 (0.4050)	0.9647 (0.3261)
	Obs*R-squared	1.4333 (0.2312)	0.3842 (0.5354)	0.8016 (0.3706)	1.0068 (0.3157)	0.0402 (0.8412)	0.4809 (0.4880)	1.0418 (0.3074)	1.3030 (0.2537)	1.0756 (0.2997)	1.4753 (0.2245)	4.3986 (0.0360)	1.0763 (0.2995)	0.2122 (0.6450)	0.5482 (0.4591)	1.7853 (0.1815)	0.6943 (0.4047)	0.9655 (0.3261)

Table 5.64: Results of ARCH effect of Kuwait with Other Countries

		Canada	China	India	Indonesia	Japan	Malaysia	Pakistan	Sri-Lanka	Turkey	UK	US	Qatar	KSA	Dubai	Taiwan	Thailand	Bahrain
ARCH Test	F-stat	0.4959 (0.4814)	2.4802 (0.1155)	0.7808 (0.3770)	0.4350 (0.5096)	0.4877 (0.4851)	1.5805 (0.2089)	1.3690 (0.2422)	1.8538 (0.1735)	0.4323 (0.5109)	2.9999 (0.0835)	2.3469 (0.1257)	1.2813 (0.2578)	2.2636 (0.1327)	0.4341 (0.5101)	0.6220 (0.4304)	2.5519 (0.1104)	1.8574 (0.1731)
	Obs*R-squared	0.4964 (0.4811)	2.4794 (0.1153)	0.7814 (0.3767)	0.4355 (0.5093)	0.4882 (0.4847)	1.5809 (0.2086)	1.3696 (0.2419)	1.8540 (0.1733)	0.4328 (0.5106)	2.9979 (0.0834)	2.3464 (0.1256)	1.2819 (0.2575)	2.2632 (0.1325)	0.4345 (0.5098)	0.6225 (0.4301)	2.5510 (0.1102)	1.8576 (0.1729)

Table 5.65: Results of ARCH effect of Malaysia with Other Countries

		Canada	China	India	Indonesia	Japan	Kuwait	Pakistan	Sri-Lanka	Turkey	UK	US	Qatar	KSA	Dubai	Taiwan	Thailand	Bahrain
ARCH Test	F-stat	0.0384 (0.8446)	0.0295 (0.8636)	0.4913 (0.4834)	0.8148 (0.3669)	0.9300 (0.3350)	0.0544 (0.8156)	0.0890 (0.7655)	0.0883 (0.7663)	0.35552 (0.5511)	0.2372 (0.6263)	0.2218 (0.6377)	0.0902 (0.7639)	0.0417 (0.8381)	0.0922 (0.7615)	0.2672 (0.6053)	0.1266 (0.7220)	0.048360 (0.8260)
	Obs*R-squared	0.0385 (0.8444)	0.0295 (0.8635)	0.4918 (0.4831)	0.8154 (0.3665)	0.9307 (0.3347)	0.0544 (0.8155)	0.0891 (0.7653)	0.0885 (0.7661)	0.3559 (0.5508)	0.2375 (0.6260)	0.2221 (0.6374)	0.0903 (0.7637)	0.0418 (0.8380)	0.0923 (0.7613)	0.2675 (0.6050)	0.1268 (0.7218)	0.048423 (0.8260)

Table 5.66: Results of ARCH effect of Pakistan with Other Countries

		Canada	China	India	Indonesia	Japan	Kuwait	Pakistan	Sri-Lanka	Turkey	UK	US	Qatar	KSA	Dubai	Taiwan	Thailand	Bahrain
ARCH Test	F-stat	3.0188 (0.0825)	2.5616 (0.1097)	3.1816 (0.0747)	2.8841 (0.0897)	2.9301 (0.0871)	3.2145 (0.0732)	2.7034 (0.1003)	3.0946 (0.0788)	2.9455 (0.0863)	3.3884 (0.0658)	2.6887 (0.1013)	2.1927 (0.1389)	3.7558 (0.0528)	2.506 (0.1136)	2.5503 (0.1105)	2.9150 (0.08800	2.5600 (0.1098)
	Obs*R-squared	3.0167 (0.0824)	2.5607 (0.1096)	3.1792 (0.0746)	2.8824 (0.0896)	2.9283 (0.0870)	3.2119 (0.0731)	2.7021 (0.1002)	3.0924 (0.0787)	2.9437 (0.0862)	3.3853 (0.0658)	2.6875 (0.1011)	2.1925 (0.1387)	3.7514 (0.0528)	2.5053 (0.1135)	2.5494 (0.1103)	2.9132 (0.0879)	2.5591 (0.1098)

Table 5.67: Results of ARCH effect of SriLanka with Other Countries

		Canada	China	India	Indonesia	Japan	Kuwait	Malaysia	Pakistan	Turkey	UK	US	Qatar	KSA	Dubai	Taiwan	Thailand	Bahrain
ARCH Test	F-stat	0.6003 (0.4386)	0.3658 (0.5453)	0.2622 (0.6087)	0.1883 (0.6644)	0.1983 (0.6562)	0.3044 (0.5812)	0.2633 (0.6079)	0.3158 (0.5742)	0.2616 (0.6091)	0.2945 (0.5874)	0.2454 (0.6204)	0.1476 (0.7009)	0.3192 (0.5721)	0.2451 (0.6206)	0.3131 (0.5758)	0.2768 (0.5989)	0.1874 (0.6652)
	Obs*R-squared	0.6009 (0.4382)	0.3664 (0.5450)	0.2625 (0.6084)	0.1885 (0.6641)	0.1985 (0.6559)	0.3048 (0.5809)	0.2636 (0.6076)	0.3162 (0.5739)	0.2619 (0.6088)	0.2948 (0.5872)	0.2457 (0.6201)	0.14778 (0.7007)	0.3196 (0.5718)	0.2454 (0.6203)	0.3135 (0.5755)	0.2771 (0.5986)	0.1876 (0.6649)

Table 5.68: Results of ARCH effect of Turkey with Other Countries

		Canada	China	India	Indonesia	Japan	Kuwait	Malaysia	Pakistan	Sri-Lanka	UK	US	Qatar	KSA	Dubai	Taiwan	Thailand	Bahrain
ARCH Test	F-stat	0.7184 (0.3968)	0.9342 (0.3339)	0.7217 (0.3957)	0.8545 (0.3554)	1.3832 (0.2397)	0.8058 (0.3695)	0.8267 (0.3634)	0.9352 (0.3337)	0.8278 (0.3631)	0.50730 (0.4764)	0.2007 (0.6542)	0.6533 (0.4191)	0.8370 (0.3604)	0.8973 (0.3437)	0.4799 (0.4886)	0.5798 (0.4465)	1.0836 (0.2981)
	Obs*R-squared	0.7190 (0.3965)	0.9348 (0.3336)	0.7224 (0.3953)	0.8551 (0.3551)	1.3838 (0.2395)	0.8064 (0.3692)	0.8273 (0.3630)	0.9358 (0.3333)	0.8284 (0.3627)	0.5078 (0.4761)	0.2009 (0.6540)	0.6538 (0.4191)	0.8376 (0.3601)	0.8979 (0.3433)	0.4804 (0.4882)	0.5803 (0.4462)	1.0842 (0.2977)

Table 5.69: Results of ARCH effect of UK with Other Countries

		Canada	China	India	Indonesia	Japan	Kuwait	Malaysia	Pakistan	Sri-Lanka	Turkey	US	Qatar	KSA	Dubai	Taiwan	Thailand	Bahrain
ARCH Test	F-stat	0.7768 (0.3783)	0.1761 (0.6748)	0.5344 (0.4649)	0.0849 (0.7708)	0.6848 (0.4081)	0.0269 (0.8697)	0.0075 (0.9308)	0.0334 (0.8550)	0.001 (0.9744)	0.0002 (0.9881)	0.7198 (0.3963)	0.0053 (0.9419)	0.0098 (0.9211)	0.0354 (0.8507)	0.0305 (0.8615)	0.0288 (0.8652)	0.1676 (0.6823)
	Obs*R-squared	0.7774 (0.3779)	0.1763 (0.6746)	0.5349 (0.4645)	0.0850 (0.7706)	0.6854 (0.4077)	0.0269 (0.8696)	0.0075 (0.9307)	0.0334 (0.8549)	0.001 (0.9743)	0.0002 (0.9881)	0.7205 (0.3960)	0.0053 (0.9419)	0.0098 (0.9211)	0.0355 (0.8506)	0.0305 (0.8614)	0.0287 (0.8651)	0.16784 (0.6820)

Table 5.70: Results of ARCH effect of US with Other Countries

		Canada	China	India	Indonesia	Japan	Kuwait	Malaysia	Pakistan	Sri-Lanka	Turkey	UK	Qatar	KSA	Dubai	Taiwan	Thailand	Bahrain
ARCH Test	F-stat	0.1569 (0.6921)	0.2729 (0.6015)	0.8855 (0.3468)	0.2202 (0.6390)	0.2925 (0.5887)	0.6109 (0.4346)	0.5689 (0.4508)	0.9090 (0.3405)	0.5835 (0.4451)	0.1961 (0.6580)	0.8310 (0.3621)	0.81153 (0.3678)	0.0101 (0.9198)	0.5766 (0.4478)	0.0015 (0.9684)	0.1568 (0.6922)	0.9324 (0.3344)
	Obs*R-squared	0.1571 (0.6918)	0.2732 (0.6012)	0.8862 (0.3465)	0.2204 (0.6388)	0.2928 (0.5884)	0.6114 (0.4342)	0.5694 (0.4505)	0.9096 (0.3402)	0.5841 (0.4447)	0.1963 (0.6577)	0.8317 (0.3618)	0.8122 (0.3675)	0.0101 (0.9197)	0.5771 (0.4474)	0.0015 (0.9684)	0.1570 (0.6919)	0.9331 (0.3344)

Table 5.71: Results of ARCH effect of Qatar with Other Countries

		Canada	China	India	Indonesia	Japan	Kuwait	Malaysia	Pakistan	Sri-Lanka	Turkey	UK	US	KSA	Dubai	Taiwan	Thailand	Bahrain
ARCH Test	F-stat	1.3741 (0.2413)	1.5880 (0.2078)	1.1589 (0.2819)	1.16756 (0.2801)	1.9470 (0.1631)	1.5520 (0.2130)	3.3488 (0.0675)	1.6549 (0.1985)	1.6675 (0.1968)	1.2469 (0.2643)	1.2934 (0.2556)	1.2202 (0.2695)	0.0136 (0.9071)	1.6313 (0.2017)	1.8236 (0.1771)	2.0027 (0.1572)	1.3704 (0.2419)
	Obs*R-squared	1.3745 (0.2410)	1.5884 (0.2075)	1.1595 (0.2816)	1.1682 (0.2798)	1.9470 (0.1629)	1.5525 (0.2128)	3.3458 (0.0674)	1.6553 (0.1982)	1.6678 (0.1965)	1.2476 (0.2640)	1.2940 (0.2553)	1.2209 (0.2692)	0.0136 (0.9070)	1.6317 (0.2015)	1.8238 (0.1769)	2.00276 (0.1570)	1.3710 (0.2416)

Table 5.72: Results of ARCH effect of KSA with Other Countries

		Canada	China	India	Indonesia	Japan	Kuwait	Malaysia	Pakistan	Sri-Lanka	Turkey	UK	US	Qatar	Dubai	Taiwan	Thailand	Bahrain
ARCH Test	F-stat	0.1066 (0.7440)	0.1346 (0.7137)	0.2659 (0.6062)	0.1817 ()0.6699	0.1515 (0.6972)	0.1720 (0.6784)	0.1355 (0.7128)	0.1382 (0.7101)	0.0947 (0.7583)	0.1282 (0.7203)	0.0614 (0.8043)	0.0303 (0.8617)	0.0197 (0.8884)	0.1542 (0.6946)	0.1089 (0.7415)	0.0799 (0.7774)	0.3411 (0.5593)
	Obs*R-squared	0.1068 (0.7438)	0.1348 (0.7135)	0.2662 (0.6059)	0.1819 (0.6697)	0.1517 (0.6969)	0.1722 (0.6782)	0.1357 (0.7126)	0.1384 (0.7099)	0.0948 (0.7581)	0.1283 (0.7201)	0.0615 (0.8042)	0.0304 (0.8616)	0.0197 (0.8883)	0.1544 (0.6943)	0.1090 (0.7413)	0.0800 (0.7772)	0.3415 (0.5593)

Table 5.73: Results of ARCH effect of Dubai with Other Countries

		Canada	China	India	Indonesia	Japan	Kuwait	Malaysia	Pakistan	Sri-Lanka	Turkey	UK	US	Qatar	KSA	Taiwan	Thailand	Bahrain
ARCH Test	F-stat	0.3529 (0.5526)	0.6353 (0.4255)	0.4774 (0.4897)	0.6099 (0.4350)	0.0724 (0.7879)	0.0042 (0.9480)	0.7683 (0.3809)	0.4164 (0.5188)	0.3438 (0.5577)	0.3679 (0.5442)	0.3348 (0.5630)	0.3476 (0.5556)		0.0001 (0.9909)	0.1529 (0.6958)	1.0129 (0.3144)	0.4147 (0.5197)
	Obs*R-squared	0.3533 (0.5523)	0.6359 (0.4252)	0.4778 (0.4894)	0.6104 (0.4346)	0.0725 (0.7877)	0.0042 (0.9480)	0.7689 (0.3806)	0.4168 (0.5185)	0.3442 (0.5574)	0.3683 (0.5439)	0.3351 (0.5627)	0.3480 (0.5552)		0.0001 (0.9909)	0.1531 (0.6956)	1.0135 (0.3141)	0.4152 (0.5194)

Table 5.74: Results of ARCH effect of Taiwan with Other Countries

		Canada	China	India	Indonesia	Japan	Kuwait	Malaysia	Pakistan	Sri-Lanka	Turkey	UK	US	Qatar	KSA	Dubai	Thailand	Bahrain
ARCH Test	F-stat	0.0898 (0.7645)	0.4486 (0.5031)	0.1238 (0.7250)	0.0028 (0.9574)	0.0792 (0.7785)	0.3537 (0.5521)	0.0766 (0.7820)	0.3884 (0.5332)	0.0205 (0.8860)	0.1616 (0.6877)	0.2543 (0.6141)	0.8296 (0.3625)	0.0296 (0.8634)	0.3253 (0.5685)	0.5940 (0.4410)	0.4141 (0.5200)	0.2891 (0.5908)
	Obs*R-squared	0.0899 (0.7643)	0.4491 (0.5028)	0.1240 (0.7247)	0.0028 (0.9573)	0.0793 (0.7783)	0.3541 (0.5518)	0.0767 (0.7818)	0.3888 (0.5329)	0.0206 (0.8859)	0.1618 (0.6875)	0.2546 (0.6138)	0.8302 (0.3622)	0.0296 (0.8632)	0.3257 (0.5682)	0.5946 (0.4406)	0.4146 (0.5197)	0.2894 (0.5905)

Table 5.74: Results of ARCH effect of Thailand with Other Countries

		Canada	China	India	Indonesia	Japan	Kuwait	Malaysia	Pakistan	Sri-Lanka	Turkey	UK	US	Qatar	KSA	Dubai	Taiwan	Bahrain
ARCH Test	F-stat	0.4764 (0.4902)	0.2718 (0.6022)	0.9008 (0.3427)	0.2922 (0.5889)	0.1167 (0.7327)	0.1666 (0.6832)	0.6261 (0.4289)	0.3709 (0.5426)	0.0944 (0.7587)	0.3430 (0.5581)	0.0023 (0.9615)	0.0261 (0.8717)	0.0233 (0.8785)	0.0801 (0.7772)	0.0580 (0.8097)	0.0013 (0.9714)	0.0346 (0.8525)
	Obs*R-squared	0.4769 (0.4898)	0.2721 (0.6019)	0.9015 (0.3424)	0.2925 (0.5886)	0.1168 (0.7325)	0.1668 (0.6830)	0.6267 (0.4286)	0.3713 (0.5423)	0.0945 (0.7585)	0.3435 (0.5578)	0.0023 (0.9615)	0.0261 (0.8715)	0.0234 (0.8784)	0.0802 (0.7770)	0.0581 (0.8095)	0.0013 (0.9713)	0.0346 (0.8524)

Table 5.75: Results of ARCH effect of Bahrain with Other Countries

		Canada	China	India	Indonesia	Japan	Kuwait	Malaysia	Pakistan	Sri-Lanka	Turkey	UK	US	Qatar	KSA	Dubai	Taiwan	Thailand
ARCH Test	F-stat	0.4071 (0.5232)	0.3881 (0.5334)	0.4480 (0.5033)	0.3649 (0.5459)	0.5389 (0.4630)	0.4557 ()0.4997	0.4175 (0.5182)	0.5077 (0.4762)	0.4838 (0.4868)	0.4593 (0.4981)	0.5437 (0.4610)	0.4556 (0.4998)	0.3772 (0.5392)	0.4491 (0.5029)	0.5459 (0.4601)	0.2141 (0.6436)	0.4505 (0.5022)
	Obs*R-squared	0.4075 (0.5235)	0.3885 (0.5331)	0.4485 (0.5030)	0.3653 (0.5456)	0.5394 (0.4627)	0.4561 (0.4994)	0.4180 (0.5179)	0.5082 (0.4759)	0.4843 (0.4865)	0.4597 (0.4977)	0.5443 (0.4607)	0.4561 (0.4994)	0.3777 (0.5389)	0.4495 (0.5026)	0.5464 (0.4598)	0.2144 (0.6433)	0.4509 (0.5019)

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