“Internationalization Vs. Regionalization of Volatility Spillover in the Asian Countries Stock Markets”

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ISLAMABAD

November 2016

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A research thesis submitted to the Department of Management Sciences,
Capital University of Science & Technology, Islamabad
in partial fulfilment of the requirements for the degree of

MASTER OF SCIENCE IN MANAGEMENT SCIENCES (FINANCE)

DEPARTMENT OF MANAGEMENT SCIENCES
CAPITAL UNIVERSITY OF SCIENCE & TECHNOLOGY
ISLAMABAD
November 2016

CAPITAL UNIVERSITY OF SCIENCE & TECHNOLOGY
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Dedication

This thesis is dedicated to my mother Sumaira Butt &my father Mr. Zafar Iqbal Butt (late). Although he is no longer of this world, his memories continue to regulate my life. I won't forget you.

I am also dedicated this work to my uncle Mr. Ghulam Farooq Dogar, brother Zeeshan Ali, sister Dr. Madiha Butt, nephew Muhammad Abdullah and supervisor Dr. Arshad Hassan whose categorical encouragement and prop up made it possible for me to finish the work. Thank you so much sir.

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CERTIFICATE

This is to certify that **Miss Maheen Butt** bearing Registration No. **MMS143055** has incorporated all observations, suggestions and comments made by the external evaluators as well as the internal examiners and thesis supervisor **Dr. Arshad Hassan** at Capital University of Science and Technology, Islamabad. The title of her Thesis is: **"Internationalization Vs. Regionalization of Volatility Spillover in the Asian Countries Stock Markets".**

Forwarded for necessary action

Dr. Arshad Hassan

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STATEMENT BY CANDIDATE

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

MAHEEN BUTT

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ACKNOWLEDGEMENTS

First of all I would like to thanks Almighty Allah who gave me courage to complete this thesis. I would like to express my sincere thanks to a number of people who have made the completion of this thesis possible. I am extremely grateful to all of them.

I wish to thank my supervisors Dr. Arshad Hassan (Dean, Faculty of Management & Social Sciences, Capital University of Science & Technology, Islamabad, Pakistan) who have provided invaluable instruction, mentorship and encouragement throughout the thesis journey. Your dedication to financial research and hard work will continue to be a source of motivation and guidance for me long after the completion of this degree.

I would also like to thank Miss Saima and Mr. Sajjid Iqbal for insightful suggestions that have improved many aspects of this thesis significantly. I am also grateful to Mr. Shujahat Hashami for help and invaluable suggestions regarding research methodology and data analysis.

I wish to show my deep gratitude to my friends Uswa, Rabia, Amen and Nadia. Your persistent encouragement and moral support has made the difference in helping me persevere towards the completion of this journey.

Finally, I pay my deep regard to my beloved parents, uncle Mr. Ghulam Farooq Dogar, sister Dr. Madiha Butt and brother Mr. Zeeshan Ali, whose selfless care, love, devotion and prayers have made me able to achieve this goal.

May Allah bless them all.

Maheen Butt

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Abstract

The objective of this study is to explores the international (UK and US markets) and regional impact of mean and volatility spillover on SAARC and ASEAN countries stock markets by using GARCH model. The study uses daily stock prices from July 1997 to December 2015. Three countries selected from SAARC (Pakistan, India and Sri Lanka) and five from ASEAN (Indonesia, Malaysia, Philippines, Singapore, and Thailand) and two in international (UK and US) are taken to explain the phenomena. Rendering to the results except Sri Lanka stock market all selected SAARC and ASEAN markets have mean and volatility spillover effect from UK and US stock markets and in the regional effect we also found that mean and volatility spillover is also observed among SAARC and ASEAN countries stock markets.

Key words: Stock markets, volatility spillover, mean spillover, SAARC and ASEAN countries.

CHAPTER # 1

1 INTRODUCTION

1.1 Internationalization vs Regionalization

During last few decades it has been observed that stock markets are increasingly integrating due to globalization. Such integration is started after liberalization and with the passage of time few countries have economically dominated the global seen and other economically dependent. Thus, a spillover behavior is observed among the countries. Moreover, economic integration has promoted spillover behavior across the stock market with in region. Global economies are integrated due to association of trade, foreign direct investment, portfolio investment. These global financial factors compel domestic markets and financial markets due to influence each other due to global financial movement pressure in sequential or unsystematic.

The links between domestic and international markets emerge because of internationalization factors. This integration due to globalization results in transmission of effects the market returns on return and volatility of other markets. Moreover, financial development provides supports for higher integration, transmission of returns and volatility and market maturity. As in local markets buyers and seller joins the market to trade with each other. Similarly, in international market international buyers and sellers create economical and financial relationship.

It is important for international investor to diversify their investment with high allocation of funds managed by international portfolio managers. Moving with diversified way in global and regional context market, limits the chance of risk with some decision. This capital inflow also creates

linkages between various markets. This linkages and transmission has input on returns on volatility of relevant market.

So, this study is based on efficient market theory presented by Fama (1970 &1991) Market efficiency theory argues that price adjust to the arrival of new information. As market are integrated so, information created in one market also flows to other markets. Thus behavior one market inclines the others. Similarly unexpected movement may create volatility in market.

Volatility spillover is flow of financial shocks from one country to another due to globalization effects. International equity markets influence developing equity markets because of economic, financial and cultural dependence. Effects may transfer negatively and positively. Therefore globalization may lead to volatility spillover and affect various stock markets. Such effects are observed and investigated in various past of the working including Europe, Latin America, Japan, China, Pakistan, India, and Africa, BRICS and MENA.

The UK and USA market also effect ASIAN countries like SAARC and ASEAN stock markets and this influence is increase day by day. The existence of mean and volatility spillover is observed on international level as well as in regional level. This means that a regional market may effects another regional market. This effect is considered as segmentation or regionalization.

The study examines mean and volatility spillover from UK and US to selected countries of SAARC and ASEAN as well as within selected SAARC and ASEAN markets. SAARC comprises of 8 countries. That includes Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka. The Nepal, Maldives, Afghanistan and Bhutan are very small economies and main market is comprises to Pakistan, India, Bangladesh and Sri Lanka. Small markets have little international and local integrations so; they are not included in study. The data of Bangladesh for daily prices could

not obtained so, study is include to Pakistan, India and Sri Lanka which are major equity markets of SAARC.

ASEAN comprises of 10 countries. ASEAN is found in 1967 in Bangkok by the five member countries: Indonesia, Malaysia, Philippines, Singapore, and Thailand. Brunei Darussalam joined in 1984, Vietnam in 1995, Laos and Myanmar in 1997, and Cambodia in 1999.The Brunei Darussalam, Vietnam, Laos, Myanmar and Cambodia are new member and are small market and have weak corporate relation regarding stock markets. That's why the study includes major equity markets of ASEAN Indonesia, Malaysia, Philippines, Singapore, and Thailand.

1.2 International Stock Exchanges

1.2.1 United Kingdom Stock Exchange

Financial Times Stock Exchange is the stock exchange of UK. It is established in 1984. Its market capitalization is $ 3272 billion. Its indices are FTSE 250 Index, FTSE 350 Index, FTSE Small Cap Index, FTSE All-Share Index, FTSE Fledgling Index and FTSE AIM UK 50 Index.

1.2.2 United States of America Stock Exchange

New York stock exchange is main stock exchange of US. It is founded in 1817. It has 2800 companies with market capitalization $ 18,486 billion. Its major indices are Dow Jones industrial average, NYSE composite and S&P 100.

1.3 Stock Exchange in SAARC and ASEAN countries

1.3.1 Pakistan Stock exchange

There are three stock exchanges in Pakistan which is based in Karachi, Islamabad and Lahore. The KSE is the leading exchange of the country. It is located in Karachi and is incorporated in 1949. LSE

is founded in 1970 and ISE is founded in 1989. This is transformed into Pakistan stock market in 2016. After integration of all three markets and presently it had 559 listed companies. Its market capitalization is $ 75.1 billion as on 9th March, 2015.The indices are KSE-100, KSE-30, KSE- all shares index and KMI-30 index.

1.3.2 India Stock Exchange

Bombay Stock Exchange (SENSEX) is established in 1875. Its market capitalization is $ 1482 billion. It has 5749 listed companies. Its indices are BSE SENSEX, BSE small cap, BSE mid cap and BSE 500.

1.3.3 Sri Lanka Stock Exchange

Colombo Stock Exchange is the main stock exchange in Sri Lanka. It provides a fully automated trading platform. It is established in 1985. CSE has 294 listed companies. Its market capitalization is $ 21 billion. Its indices are all shares price index (ASPI) and S&P Sri Lanka 20 Index (S& P SL20).

1.3.4 Indonesia Stock Exchange

Indonesian Stock Exchange is a stock exchange based in Jakarta, Indonesia. It is earlier known as Jakarta Stock Exchange (JSX) before its name changed in 2007 after merging with Surabaya Stock Exchange (SSX). It is founded in 1912. It has 462 listed companies. Its market capitalization is $ 347 billion. Its indexes are IDX composite, Jakarta Islamic index and LQ-45.

1.3.5 Malaysia Stock Exchange

Bursa Malaysia is commonly as Kuala Lumpur Stock Exchange (KLSE). It is established in 1964. Its market capitalization is $ 380 billion. Its indices are KLSE and FTSC Bursa Malaysia index.

1.3.6 Philippines Stock Exchange

The Philippines Stock Exchange is the national stock exchange of the Philippines. It starts the operations in 1927. Its market capitalization is $ 238 billion. Its indices are PSE all shares index, PSE composite index, PSE financial index and PSE mining and oil index.

1.3.7 Singapore Stock Exchange

Singapore Exchange Limited is located in Singapore and provides different services related to securities and derivatives trading and others. Its market capitalization is $ 639 billion. The numbers of listed companies are 776.Its indices are FTSC group and Straits Times index.

1.3.8 Thailand Stock Exchange

The national stock exchange of Thailand is the Stock Exchange of Thailand. It has 584 listed companies. Its market capitalization is $ 368 billion. Its indices are SET Index, SET50 Index and SET100 Index.

1.4 Problem Statement

SAARC and ASEAN stock markets are emerging markets that are focus of local as well as international investors. During last few decades, in SAARC and ASEAN stock markets have observed phenomenal growth and high volatility. Thus markets are generally considered to be influenced by domestic, regional and international dynamics. Such behavior towards returns and volatility spillovers has serious concern and needs investigations. Thus, the current study aims to investigate the mean and volatility spillover at international and regional level in selected SAARC and ASEAN stock markets.

1.5 Research Gap

This study investigates the influence of international and regional markets on the returns and volatility of SAARC and ASEAN markets as this area is still less captured.

1.6 Research Questions

The above discussion rises following questions.

1) Whether UK market returns influences the volatility of SAARC and ASEAN Stock markets?
2) Whether US market returns influences the volatility of SAARC and ASEAN Stock markets?
3) What is the impact of UK market on the returns of SAARC and ASEAN Stock markets?
4) What is the impact of US market on the returns of SAARC and ASEAN Stock markets?
5) Whether volatility spillover exists among SAARC countries?
6) Whether volatility spillover exists among ASEAN countries?
7) How positive and negative returns and shocks of regional markets influence returns of SAARC and ASEAN equity markets.
8) How positive and negative behavior of international markets influence the returns of equity markets of SAARC and ASEAN countries.

1.7 Research Objectives

This study observed following objectives.

1) To provide insight about the impact of international market on the volatility of SAARC and ASEAN markets.
2) To explore the impact of international markets on returns of SAARC and ASEAN markets.
3) To provide insight about volatility spillover among SAARC countries.
4) To provide insight about volatility spillover among ASEAN countries.

5) To explain whether volatility spillover is symmetric under positive and negative market behavior of international and regional markets.

1.8 Significance of study

This study is helpful for investors, economic policy makers and academia. Investors can formulate effective approaches against volatilities spillover of ASIAN stock markets. They may be able to know about the informational efficiency of the selected countries stock markets. They may be able to manage effective portfolios in the selected countries to enhance their stock returns. For economic policy makers, they help to understand about the information of returns and volatility spillover of SAARC and ASEAN stock markets so that they make policy easily to avoid contagious of spillover. Policies may be formulated and implemented to manage the volatilities of stock markets. For domestic fund managers, the volatility spillover between the two stock markets may provide them advantage in forecasting the behavior of one market in response to change in another market. For academia purpose this study is also helpful to the researchers to have insight about the volatility spillover in ASIAN stock markets and extend literature in the field of this research domain.

1.9 Organization of Study

This study has been represented in five chapters as detailed below

Chapter no. 1: Introduction.

Chapter no. 2: Literature review.

Chapter no. 3: Research Methodology.

Chapter no. 4: Results and Analysis

Chapter no. 5: Discussion and Conclusions.

CHAPTER # 2

2.1 LITERATURE REVIEW

A large number of studies have investigated the spillover behavior of volatility across the markets. The emerging markets across the globe are integrating with each other in response to the globalization and enrichment in the overall economic conditions with the developed equity markets and it stimulate to increase their movements accordingly with developed stock markets. In globally integration, equity markets are also shuffled by equity markets factors that have major concern with investors and academia.

Taşdemir and Yalama (2014) state that collaborative nature of across border economies to create many investment opportunities. It has become a key point to consider the volatility spillover behavior in across border allocation of resources.

Volatility spillover is flow of financial shocks from one market to other market. Volatility spillover affects more than one stock market. Such effects are investigated in various countries of Europe, America and Asia. Volatility spillover is based on correlation of returns. If returns are highly correlated the volatility spillover may exits.

Volatility shocks are operated by informational directions. Li (2007) conclude that volatility of emerging market is linked with the advanced markets' volatilities, as native markets are integrated with the developed stock markets.

Al-Zeaud and Al-Shbiel (2012) state that changes in market returns and complied with volatility spillovers gives birth to market shocks. Such spillover is also observed by Japan to pacific markets and it also influences US and UK markets along with ASEAN and SAARC (Ng, 2000).

Xiao and Dhesi (2010) use multivariate GARCH-BEKK model to explore the volatility transmission effects among the European and U.S stock markets. Results report that in the international equity market volatility spillover effects are largely present. The main volatility teller is UK market inside the European stock market although the main exporter global is US market.

Abou-Zaid (2011) investigates the global transmission of volatility flow from U.S. and UK to selected MENA markets: Turkey, Egypt and Israel during 1997 to 2007. Results report that Turkey is not influenced by the US stock market while Egypt and Israel are significantly influenced by US market.

Moon and Yu (2010) study the short-run spillover effects of returns and volatilities during 1997 to 2007 between US and China by using GARCH model. Results report that symmetric and asymmetric volatility spillover effect flow from U.S to the China stock market.

Allen, Amram and McAleer (2013) examine the volatility spillovers from the Chinese stock market to its dealing partners that are Japan, Singapore, Australia, Hong Kong and USA. Results report that evidence of volatility spillovers across these markets.

Diebold and Yilmaz (2009) formulate and observe specific and distinct measures of volatility spillovers and returns. Result report that return spillovers show a lightly increasing trend but no bursts, whereas no trend but clear bursts in volatility spillover.

Yılmaz (2010) examines the degree of contagion and dependence across the East Asian equity markets. Results reveal that return spillover among the East Asian equity markets. The study also provides evidence about significant bursts during major market crises.

Hong (2001) state that volatilities not only effects country to country, return level but also forces the market exchange rates. Baele and Inghelbrecht (2009) contribute by investigating globalization factor and its correlation with diversification moves and finds significant contribution at global level.

Zhou, Zhang and Zhang (2012) measure the directional volatility spillovers among world equity markets and China equity market. Volatility of China market is a significantly positive impact on other markets. Results also report that volatility connections between the markets of Hong Kong, Taiwan and China were more prominent than Western, and other Asian markets.

Majdoub and Mansour (2014) report that return spillover is found in Islamic equity market instruments and volatility of Islamic estates more with American and European market.

Yu and Hassan (2008) uses AR-GARCH models and results report that there are large and mainly positive volatility spillovers and volatility persistence in conditional volatility between world stock markets and MENA. Cross-volatility spillovers for all the markets are generally lower than own-volatility spillovers.

Gebka and Serwa (2007) investigate volatility spillover among emerging, western European and Latin American markets and report that significant inter-regional volatility spillover. Such volatility spillovers effect is also found in Asian and Indian context because of stock market integration.

International transmission causes the good or bad effect on regional stock market as the news that international volatility shuffle result in local market volatility as it fluctuate returns. Bae and Karolyi (1994) investigate the good and bad effect of international volatility transmission in Japan and report significant regional and country specific transmission of volatility.

Evans and Hnatkovska (2012) concludes that it is not limited just to volatility such transmission also affects the corporate cash flows, and corporate integration along with financial integrations. Volatility is also affected due to various factors i.e. time constraints, market price, market movements, market age, cash flows, market capitalization, richness of market and market origin.

Hamao, Masulis and Ng (1990) investigate short-run interdependence of price volatility and price through main international equity markets (London, New York and Tokyo). Results report price volatility spillover from New York to Tokyo, UK to Tokyo and New York to UK.

Sakthivel, Bodkhe and Kamaiah (2012) states that any external information acknowledged by U.S and Japan equity markets is then transferred to Asian and European equity markets. It shows that there is volatility spillover among U.S and Indian stock markets because these two economies are integrated over international trade and investment. Such behavior is found due to investment flow, FDI restrictions, economic assistances, political influences and other behavioral traits. If these factors adversely move in any market, it raises the (financial shocks) volatility shock in any sequence on that market.

The market shocks are also transferred from one market to another because of globalized uniformity. Ng (2000) identifies three categories of shocks i-e worldwide, local and regional and reports that both regional and world problems are significant for market volatility in the Pacific Basin region, and the world market effect is greater than the regional market.

Fratzscher (2002) reports that asymmetric-negative shocks are more strongly transferred than positive ones and that there are often skewed as large shocks have larger effects than small ones. Asgharian and Nossman (2013) report that volatility spillovers have significantly for shocks in Asian countries.

Beirne et.al (2010) use VAR GARACH approach to study forty one markets (EME's) and report that mixed evidence of spillover in regional level and also in global level. Liu (2008) reports similar results regarding influence of Chinese market on ASEAN states.

Abbas, Khan and Shah (2013) explore the volatility spillover among the developed (UK, U.S, Singapore and Japan) markets and Asian markets(India, Pakistan, Sri Lanka and China) and reports that volatility spillover is present among countries that have economic links and transmission of volatility is also present between markets that are on unfavorable terms.

Li (2012) argue that volatility spillover is the result of economic integration, exchange rate risk factor, instability in financial setups and political forces. Christiansen (2007) conclude that United States market is less volatile then European.

Wang and Wang (2010) observe stock markets connections among US, Japan and China in terms of price and volatility spillovers. Results report that volatility spillovers is exist between these markets and the degree of influence by the advanced market on the emerging market is associated with the degree of market openness of the emerging economy.

Miyakoshi (2003) explore how the Asian stock markets are influenced by the main regional market (Japan) as well as the main global market (U.S). Results report that return spillovers to the Asian emerging markets from the U.S and volatility spillover to Asian markets from Japan.

Chuang, Lu and Tswei (2007) analyze Asian markets (Singapore, Taiwan, Korea, Japan and Hong Kong) and conclude that Japanese market is less vulnerable to spillover. However, it influences other countries where it has economic links.

Wang and Firth (2004) studies volatility and market returns spillover across four emerging markets of Taiwan, Hong Kong, Shanghai A and Shenzhen A and three established markets of London, Tokyo and New York. The study report a unidirectional present-day return dependency of China markets on developed markets and volatility transmission among the emerging and advanced markets is bidirectional.

Worthington and Higgs (2004) study the long and short-term price associations between (APEC) stock markets during 1995 to 2000. The study considers seven advanced markets (Japan, Singapore, Hong Kong, U.S, Japan, Canada, New Zealand and Australia) and eleven emerging markets (Korea, Chile, Malaysia, Mexico, Philippines, Russia, China, Indonesia, Peru, Thailand and Taiwan). The results report that a stationary long-run relationship and short-run causal associations are significant among the APEC equity markets. Brooks (2007) also report similar spillover behavior of volatility in emerging and less developed countries markets.

Agren (2006) reports existence of spillover of volatility in five developed markets (US, UK, Norway, Sweden and Japan) by studying weekly market data. The study observes that volatility spillover in these markets except Sweden.

Jebran and Iqbal (2016) use EGARCH model and provide evidence of bidirectional spillover among equity markets China, Pakistan, Sri Lanka and Hong Kong and foreign exchange market. The study indicates the presence of volatility transmission is unidirectional from equity markets to foreign exchange market of India.

Francis, Hasan and Hunter (2006) use Tri-variate asymmetric GARCH framework to study markets of Japan, Germany, Canada and US and report that volatility transmission among equity market and

currency is bidirectional for German and U.S. It also reports asymmetric behavior among these markets.

Aloui (2007) observe American market with five other European markets by using EGARCH model and supports that volatility spillover between currency and equity markets is bi-directional. Andreou, Matsi and Savvides (2013) investigate twelve developed markets from Latin America and from Asia and finds significant volatility spillover globally and regionally.

Chkili (2012) investigate eight emerging markets (Indonesia, South Korea, Singapore, Mexico, Malaysia, Brazil, Argentina and Hong Kong) by using BEKK-MGARCH model. The study reports presence of bidirectional shocks and Volatility spillover between these financial markets.

Leeves (2007) explore the period 1997 to 1999cover the Asian crisis and finds asymmetric effects of conditional volatility shocks is significant. The negative shocks causing greater volatility as compared to volatility created by positive shocks. Finding of the study further reports that asymmetric response increase from 1997 to 1998 and then declines during 1999.

Caporale, Pittis, and Spagnolo (2006) study the international transmission AFC 1997. The study uses GARCH-BEKK model and three pair wise models for South East Asian, European, US, Japanese markets. In all cases volatility spillovers are found. However, a major difference in the nature of the transmission mechanisms and magnitude of the shocks is observed.

Hammoudeh, Yuana and McAleer (2009) inspect the active volatility and its transmission using the VAR-GARCH model for (Banking, Services and Industrial/or Insurance) major sectors in four Gulf Cooperation Council economies (UAE, Saudi Arabia, Kuwait and Qatar). Results report that previous shocks matters less than the past own volatilities and between the sectors within the individual countries there is moderate instability spillover, except Qatar.

Rao (2008) observe volatility persistence and co-integration of six Middle East evolving (AGCC) equity markets with developed markets. The study displays that markets (AGCC) show significant cross and own spillover of novelties and volatility.

Mukherjee and Mishra (2006) examine the volatility spillover and return among twelve emerging Asian countries, developed countries and Indian stock market for the period of 1995 to 2005 and results report that Indian close-to-open return are less connected to foreign market return than its open-to-close return. Though, the close-to-open (overnight) volatility of India is more affected by the foreign markets.

Mukherjee and Mishra (2010) examine volatility spillover of India stock market with selected equity markets (Taiwan, Japan, Pakistan, Hong Kong, Sri Lanka Malaysia, Indonesia, Thailand, Korea, Malaysia and China). Results indicate a return spillover among India and all markets excluding Sri Lanka id bidirectional by using GARCH technique. These four markets (Singapore, Hong Kong, Korea and Thailand) are found to significantly influence flow of information to India. Without much delay most of the information gets transferred between the markets.

Joshi (2011) examine the volatility and return spillover among Asian countries (China, India, Korea, Japan, Indonesia and Hong Kong) and reports a return spillover in the markets is bidirectional: Indonesia and China, Korea and Japan, India and Hong Kong, and Hong Kong and Korea by using the GARCH-BEKK model.

Choo et al. (2011) study the volatility spillover among smaller and larger stocks of Malaysian equity market during 1992 to 2005, the study employs the GJRGARCH model. The result provides evidence of bidirectional spillover of return from larger and smaller stocks.

Singh, Kumar and Pandey (2010) investigate the volatility and return spillovers across North American, Asian and European stock markets (UK, US, Japan, China, Indonesia, India, Pakistan, Germany, France, Korea, Hong Kong, Malaysia, Canada, Taiwan and Singapore,). Use both opening and closing prices during 2000 to 2008.Results report that there is a greater regional influence among European and Asian equity markets.

Bala and Premaratne (2004) observe the volatility transmission to the Singapore equity market from that of Hong Kong, UK ,Japanese and US markets and results also report that a high degree of volatility co-movement among the Singapore market and UK, Hong Kong, Japanese and US markets.

Sakthivel and Kamaiah (2011) examine the co-movement and transmission of volatility and reports that from the UK and Japan to India there is unidirectional spillover of shocks.

Lee (2009) use bivariate GARCH model to investigate the volatility spillover between six Asian countries are Japan, South Korea, India, Singapore, Hong Kong, and Taiwan and result report that effects of volatility spillover is significant inside these countries of Asia.

Wongswan (2006) studies the information transmission to the Korean and Thai equity markets from the US and Japan and resolves that there is a significant and large connection between advanced market and evolving market at short time horizons in Asian markets.

Bekaert and Harvey (1997) analyze the volatilities of developing stock markets and initiate that in the combined markets global factors affect the volatility, but native factors affects the segmented markets.

In et al. (2001) studies the dynamic interdependence, volatility spillover, and market integration across selected stock markets and report that give-and-take spillover exist between Korea and Hong Kong and from Korea to Thailand is unidirectional spillover.

Michelfelder and Pandy (2005) use Hong Kong, India, Taiwan, Singapore, Malaysia and South Korea stock markets to observe the instability of stock returns and predictability related to Japan and the US. The study finds that emerging markets have higher volatility and lower persistence of shocks than in developed markets. The volatility of advanced markets stock returns is less than developing markets in non-trading days. Lastly, US shockwaves are quickly transferred to the rest of the world.

Singhania and Anchalia (2013) study the influence on volatility of stock market (India, Japan, China and Hong Kong) returns for the duration of Eurozone debt and sub-prime crises by using EGARCH model. The study uses daily data for the period 2005 to 2011. Result reveal a positive influence on the volatility of returns of India, China and Japan in sub-prime crises except Hong Kong and a negative impression on the unpredictability of volatile stock returns of India and China during the crisis of Eurozone debt.

Ahmad, Ashraf and Ahmed (2005) explore the inter linkages and fundamental association among the US, Japan and India during the period 1999 to 2004. Results reveal that there is no lasting association of the Indian market with the U.S and Japanese stock markets, but U.S and Japan have durable causal association during 1999 to 2001 and it disappear during 2002 to 2004. There is a no association in the actions of the US and Japan with India.

Goh, Wong and Kok (2005) they use stock indices of five ASEAN countries. Contemporary correlation in stock returns is find durable and Indonesian market leads the movements of the other indices for the period of the crisis 1997. The comparative effect of external shocks is finding much

more touched during the crisis. Later the crisis a short-run connection of Malaysia with the other markets is declining.

Kim and Ryu (2015) observe the volatility spillover and return spillover among the US and Korean stock markets. The study focuses on co-jump actions among the two markets in order to describe the broadcast of unforeseen shocks. Result reveal that the US market causes return spillover effects in the Korea market, and there is significant volatility broadcast between the two markets.

Yarovaya, Brzeszczyński and Lau (2015) explore the patterns of intra- and inter-regional transmission of information across ten advanced and eleven evolving markets in America, Europe, Asian and Africa use stock index futures and stock indices and use GARCH model. Results report that markets are inclined to region-specific and domestic volatility shocks than to inter-regional contagion and also study reveal that the patterns of international transmission is difference among models using indices and futures data.

Korkmaz, Çevik and Atukeren (2012) provide a first look at the return and volatility spillovers between the CIVETS countries Colombia, Indonesia, Vietnam, Egypt, Turkey, and South Africa as a new group of frontier emerging markets. Results report that the contemporaneous spillover effects are usually low.

Shin (2005) observe the association among expected stock returns and conditional volatility in 14 developing global stock markets (Argentina, Chile, Mexico, Turkey, Venezuela, India, Colombia, Korea, Philippines, Taiwan, Brazil, Thailand, Malaysia and Greece) using GARCH in mean model. Result reports positive association with developing markets, but most of the cases such association is insignificant. Results provide slight support to the asymmetric volatility argument that stock return volatility negatively correlated with stock returns.

Theodossiou and Lee (1993) delivers understanding the degree and nature of interdependence of stock markets of the U.S, Canada, Germany, UK and Japan and uses the multivariate GARCH-M model. Volatility spillovers have significant release from the U.S stock market to all four stock markets, from the U.K stock market to the Canada stock market and from German stock market to Japan stock market.

Mulyadi (2009) examine the volatility transmission in US, Japan and Indonesia capital markets use GARCH model. Results report that one way volatility spillover from USA effecting Indonesia and bidirectional volatility spillover between Japan and Indonesia.

Wang, Gunasekarage and Power (2005) examine volatility and return spillovers from the Japanese and US stock markets to three South Asian capital markets (India, Pakistan and Sri Lanka Stock markets uses EGARCH spillover model. Study reports that return and volatility spillovers from the U.S to the Sri Lankan and Indian markets and from the Japanese to the Pakistani market.

Chiang and Doong (2001) study the relationship among the market volatility and stock returns based on seven Asian equity markets (Malaysia, Hong Kong, Philippines, South Korea, Thailand, Singapore and Taiwan) and comparison with major developed markets (US and Japan). Result report that four (Hong Kong, Singapore, Thailand and Japan) stock markets have significant results and further results show that no asymmetric effect is strongly rejected at a high level of significance.

Liu and Pan (1997) inspect the volatility spillover effects and mean return from the US and Japan to Asian stock markets (Taiwan, Hong Kong, Thailand and Singapore). Results report that the Japanese market is less influential than the US market in transferring volatilities and returns to the four Asian markets.

Badhani (2009) uses daily prices from 1996 to 2008 to study the whether the (volatility and return) spillover effects to Indian stock market from the US display asymmetric. US market return and volatility shocks have significant impact on Indian stock market volatility and return. Results report that significant response asymmetry in spillover effects both in volatility and return and Indian market returns are more sensitive to negative shocks in the US market relatively positive shocks. Although US market (Positive shocks) do not affect the volatility of Indian stock market, negative shocks significantly increase the volatility.

Gahlot (2013) explore volatility transmission among South Asian Countries stock markets. Results report that volatility of all South Asian countries is of long term nature and spillover effects are unbalanced in the sense that the spillover changed its nature after start of recession.

Choudhry (2004) examine the volatility spillover and mean returns among stock markets of friendly and political countries (India–Pakistan, Greece–Turkey and Israel–Jordan). The US has been usually and traditionally friendly toward these countries. Results report that a bi-directional volatility and mean spillover among two countries not on friendly terms. Results also provide indication that volatility and mean spillover takes place from (US) to these smaller emerging markets.

Jiang, Konstantinidi and Skiadopoulos (2012) explore the effect of news on implied volatility transmission through European and US equity markets. Results show that existence of volatility spillover and scheduled or unscheduled news generate information uncertainty and leading to a decrease (increase) in implied volatility.

Krause and Tse (2013) state that price movements constantly to Canada from the US and volatility spillovers are mainly bidirectional. Information is held more quickly into returns through transaction

in US securities, and the combination of asymmetric volatility and negative US return spillovers creates bidirectional volatility response effects.

Koulakiotis, Dasilas and Papasyriopoulos (2009) study the transmission of news (both error and volatility) among cross listed equities portfolios within three European financial regions, Germanic, French and Scandinavian area. Results reveal that portfolios of cross-listed equities (Finnish and Danish) are the main transmitters of volatility and Swiss portfolio of cross listed equities is the major exporter of error and volatility to the other portfolios of cross listed equities in the German stock market area.

Giovannetti and Velucchi (2013) analyses the relationships between (US, UK and China) stock markets, some South Saharan African emerging markets and two North African countries during 2005 to 2012, directing on the role of volatility. Results report that South Africa and US shocks significantly affect African volatility, and newly China. Moreover, US, Kenya and Tunisia are "net creators" of volatility spillovers; South Africa and China are net "absorbers.

Mamtha and Srinivasan (2016) provide the awareness of effect and cause of volatility of stock prices and as well go to bring out several features of volatility such as degree of volatility persistence, volatility clustering and mean return. The study finds that these factors (Trading volume, flow of information, investor's behavior and economical aspects) are the reasons of volatility in the stock market. It also proposes that the stock markets everywhere in the world have proven spillover effects of volatility and asymmetry response.

Le and Kakinaka (2010) observe the volatility spillover effects and mean return from the three prominent equity markets Japan, China and U.S and two developing equity markets of Malaysia and Indonesia. Use GARCH models and result report that mean spillover effects from China, U.S and

Japan markets to the Malaysia and Indonesia stock markets are significant. The magnitude of the mean spillover from the U.S market is the most significant as compared to Japan and china markets and U.S market is less influential to Malaysia, but more influential to Indonesia and Chinese market has a significant influence to both two developing markets.

Sen and Bandhopadhyay (2012) report a bidirectional contemporary as well as dynamic volatility and return spillover to Indian stock markets from U.S stock market and vice versa.

Chancharoenchai and Dibooglu (2006) explore volatility spillovers in six Southeast Asian stock markets (Indonesia, Malaysia, Korea, Thailand and Taiwan) with two most important stock markets (US and Japan). They uses GARCH-M model and study finds that Indonesia is indirectly affected by Malaysia and there is a direct volatility spillover from Japan and U.S.

Thuan (2011) use the data for the period 2003 to 2009 to test the influence of the US stock market on Vietnam stock market. Result report that S&P 500 and the Dow Jones indices affect the mean stock returns in Vietnam stock market positively but, there is no indication of volatility spillover effects.

Neaime (2006) report that information giving rise to volatilities in a known market is transferred more quickly between markets that are placed nearby geographically and among markets that are more competently prepared and more open like those of Jordan, Egypt, Turkey and Morocco. Moreover, the US, UK and Egyptian stock markets are found to influence on other markets of MENA have significantly.

Maghyereh and Awartani (2012) observe volatility and return spillover effects among (DFM) Dubai Financial Market and (ADSE)Abu Dhabi Stock Exchange. Results report that volatility and return transmission are asymmetric among ADSE and DFM. Therefore, a significant spillover effect exist in both volatility and return from DFM to ADSE.

Balli et.al., (2015)explore the volatility and return spillovers from advanced markets (US, Europe and Japan) to selected evolving countries in Asia and MENA region. Results report that significant spillover effect from advanced markets to evolving markets. Results also show factors such as portfolio investment, distance and trade volume are significant in clarifying the spillover effects.

Ranjbar and Manjunath (2011) obverse the integration and volatility spillover of Iran and seven GCC region countries stock markets by using daily prices during 2005 to 2010. Results report that there is no volatility spillover between stock market of Iran and GCC countries. Moreover, movement of volatility spillover is very weak among GCC markets.

Corradi, Distaso and Fernandes (2012) measure the volatility transmission between stock markets UK, US, Japan and China. Results expose significant volatility spillovers between these stock markets.

The review of literature leads to development of following hypothesis.

2.2 Hypothesis

H1: There is significant impact of UK market returns on volatility of stock markets of SAARC countries.

H2: There is significant impact of UK market returns on volatility of stock markets of ASEAN countries.

H3: There is significant impact of US market returns on volatility of stock markets of SAARC countries.

H4: There is significant impact of US market returns on volatility of stock markets of ASEAN countries.

H5: There is significant impact of UK market on returns of stock markets of SAARC countries.

H6: There is significant impact of UK market on returns of stock markets of ASEAN countries.

H7: There is significant impact of US market on returns of stock markets of SAARC countries.

H8: There is significant impact of US market on returns of stock markets of ASEAN countries.

H9: There is Asymmetric spillover between international markets and SAARC countries stock markets.

H10: There is Asymmetric spillover between international markets and ASEAN countries stock markets.

H11: There is Asymmetric spillover between SAARC equity markets.

H12: There is Asymmetric spillover between ASEAN equity markets.

CHAPTER # 3

3 METHODOLOGY AND DATA DESCRIPTION

3.1 Data

The study employs the daily data of stock markets indices of UK, US, Pakistan, India, Sri Lanka, Indonesia, Malaysia, Philippines, Singapore and Thailand. The international markets are represented by UK and US markets. SAARC markets are represented by Pakistan, India and Sri Lanka. ASEAN markets are represented by Indonesia, Malaysia, Philippines, Singapore, and Thailand. The period of study is starting from 01/07/1997 to 31/12/2015. The stock markets indices include are as follows:

Countries	Index
United States of America	Standard and Poor 500 index
United Kingdom	Financial Times Stock Exchange 100 Index
Pakistan	Karachi Stock Exchange
India	Small and Poor Bombay Stock Exchange
Sri Lanka	Colombo Stock Exchange
Indonesia	Jakarta Stock Exchange
Malaysia	Kuala Lumpur Stock Exchange
Philippines	Philippines Stock Exchange
Singapore	Singapore Stock Exchange
Thailand	Bangkok Stock Exchange of Thailand

3.2 Methodology

3.2.1 Volatility spillover Effect

The impact of UK and US market on volatility of equity markets of SAARC and ASEAN countries is captured by using GARCH Model

$$\sigma^2_{i,t} = \beta_o + \beta_1 e^2_{i,t-1} + \beta_2 \sigma^2_{i,t-1} + \beta_3 R_{UK,\,t} \quad (1)$$

$$\sigma^2_{i,t} = \beta_o + \beta_1 e^2_{i,t-1} + \beta_2 \sigma^2_{i,t-1} + \beta_3 R_{US,\,t} \quad (2)$$

The impact of regional markets on specific market is captured by using

$$\sigma^2_{i,t} = \varphi_0 + \varphi_1 e^2_{i,\,t-1} + \varphi_2 \sigma^2_{i,t-1} + \varphi_3 R_{j,\,t} \quad (3)$$

Where

$R_{i,\,t}$= Returns of country "i" at time "t"

$R_{j,\,t}$= Returns of country "j" which is in same region at time "t"

$e_{j,\,t}$ = Error term of country "j"

$\sigma^2_{i,t}$ is the volatility of a specific regional market at time "t"

$\sigma^2_{i,t-1}$ is the lagged volatility of a specific regional market.

$e_{i,t-1}$ is the lagged error term from a specific country.

3.2.2 Mean Spillover Effect

Mean spillover model is explained by using methodology proposed by Ng (2000) and Christiansen (2007).The international markets have mean spillover effect to individual country "i" by lagged return of international market. The mean spillover effects from UK and US to individual countries are captured by using $R_{UK,t-1}$, $R_{US,\ t-1}$, e_{UK} and $e_{US.}$

$$R_{i,t} = \beta_0 + \beta_1 R_{i,t-1} + \beta_2 R_{UK,t-1} + \beta_3 \rho_{UK,t} + e_1 \quad (4)$$

$$R_{i,t} = \beta_0 + \beta_1 R_{i,t-1} + \beta_2 R_{US,t-1} + \beta_3 \rho_{US,t} + e_2 \quad (5)$$

The impact of regional markets on specific market is captured by using

$$R_{i,t} = \beta_0 + \beta_1 R_{i,t-1} + \beta_2 R_{j,t-1} + \beta_3 \rho_{j,t} + e_1 \quad (6)$$

The error term of UK and US are calculated by Auto regression Model given below:

$$R_{UK,t} = \gamma_0 + \gamma_1 R_{UK,t-1} + \rho_{UK} \quad (7)$$

$$R_{UK,t} = \gamma_0 + \gamma_1 R_{US,t-1} + \rho_{US} \quad (8)$$

3.2.3 Asymmetric Spillover Model

Asymmetric mean equations are presented to study whether the returns of individual ASEAN and SAARC countries respond asymmetrically to the increases and declines as well as positive and negative shocks in the UK and US countries respectively.

$$R = C_{0,i} + C_{1,i} R_{i,t-1} + \gamma_{1,t} R^{+}_{i,t-1} + \gamma_{2,t} R^{-}_{i,t-1} + \varphi_{1,i} e^{+}_{i,t} + \varphi_{2,i} e^{-}_{j,t} + e_{i,t} \qquad (9)$$

Where $R^{+}_{t-1} = R_{t-1}$ if $R_{t-1} > 0$ and 0 otherwise;

$R^{-}_{t-1} = R_{t-1}$ if $R_{t-1} < 0$ and 0 otherwise:

$e^{+}_{t} = e_{t}$ if $e_{t} > 0$ and 0 otherwise:

$e^{-}_{t} = e_{t}$ if $e_{t} > 0$ and 0 otherwise

CHAPTER # 4

4.1 DATA ANALYSIS

Table # 4.1 reports the results of descriptive analysis for the returns of UK and US stock markets.

Table # 4.1 Descriptive Statistics

Returns of UK and US stock markets

	RUK	RUS
Mean	4.11E-05	0.000123
Median	0.000000	0.000000
Maximum	0.093842	0.109572
Minimum	-0.092645	-0.094695
Std. Dev.	0.010212	0.010473
Skewness	-0.170776	-0.247493
Kurtosis	12.07337	15.26355
Jarque-Bera	23211.06	42411.31
Probability	0.000000	0.000000

RUK is returns of United Kingdom and **RUS** is returns of United States of America stock markets.

The average UK returns are 0.004% and the average US returns are0.01% per day. The maximum return in UK is 9.3% and in US is 10.9% and minimum return in UK is 9% and in US is also 9%. Moreover, average standard deviation is 1.02% in UK and 1.04% in US. The negative skewness is observed in both countries. The data is found leptokurtic as kurtosis in both countries is more than 3. The Jarque-Bera test clearly provides that data is not normally distributed.

Table # 4.2 reports the statistics behavior of returns of stock markets of SAARC countries i-e Pakistan, India and Sri Lanka

Table # 4.2

Returns of stock markets of SAARC countries

	RPK	RIN	RS
Mean	0.000445	0.000267	0.000319
Median	0.000000	0.000000	0.000000
Maximum	0.127622	0.159900	0.182872
Minimum	-0.132133	-0.118092	-0.139055
Std. Dev.	0.012942	0.013052	0.009354
Skewness	-0.447337	-0.100610	0.268358
Kurtosis	14.81861	13.27145	50.15296
Jarque-Bera	39550.96	29714.82	626061.3
Probability	0.000000	0.000000	0.000000

RPK is returns of Pakistan, **RIN** is returns of India and **RS** is returns of Sri Lanka stock markets.

Average return of Pakistani market is 0.04%, return of Indian market is 0.02% and return of Sri Lankan market is 0.03%. The maximum return of Pakistani market is 12%, maximum return of Indian market is 15% and maximum return of Sri Lankan is 18%. The maximum loss incurred in one day by stock markets of Pakistan, India and Sri Lanka13%, 11% and 13% respectively. The average standard deviation in returns of stock markets of Pakistan and India is 0.013% and in Sri Lanka is 0.009%. The returns of all markets are found negatively skewed except Sri Lanka whereas the value

of Kurtosis indicates that data is peaked. The Jarque-Bera test confirms the non-normality of the returns of stock markets of Pakistan, India and Sri Lanka.

Table # 4.3 reports the statistical behavior of returns of ASEAN markets.

Table # 4.3

Returns of stock markets of ASEAN countries

	RI	RM	RP	RSG	RT
Mean	0.000272	6.66E-05	0.000134	5.55E-05	0.000121
Median	0.000000	0.000000	0.000000	0.000000	0.000000
Maximum	0.131277	0.208174	0.564300	0.128738	0.113495
Minimum	-0.127321	-0.241534	-0.555620	-0.091535	-0.160633
Std. Dev.	0.013571	0.011735	0.015402	0.010969	0.013164
Skewness	-0.208087	0.551916	0.441002	0.026618	0.055558
Kurtosis	15.46927	89.39703	525.2486	15.54662	15.92021
Jarque-Bera	43823.59	2101896.	76788896	44320.41	47001.73
Probability	0.000000	0.000000	0.000000	0.000000	0.000000

RI is returns of Indonesia, **RM** is returns of Malaysia, **RP** is returns of Philippines, **RSG** is returns of Singapore and **RT** is returns of Thailand stock markets.

The markets includes Indonesia, Malaysia, Philippines, Singapore and Thailand and average returns are 02%, 0.006%, 01%, 0.005% and 01% respectively. Maximum return per day is 13% for Indonesia, 20% for Malaysia, 56% for Philippines, 12% for Singapore and 11% for Thailand. Maximum loss incurred by stock markets of Indonesia, Malaysia, Philippines, Singapore and Thailand as 12%, 24%, 55%, 09% and 16 % as reported above table. Moreover, the returns are found

negatively Skewed. The value of kurtosis is higher than 3 indicating that data is leptokurtic. Philippines market is must volatile market with 1.54% variation per day followed by Indonesian and Thailand markets. The Jarque-Berra test rejects the null hypothesis of normality.

Table # 4.4 reports the results of correlation between UK, US, Pakistan, India and Sri Lanka markets.

Table # 4.4 Correlation Matrix

Returns of UK, US and SAARC countries

	RUK	*RUS*	*RPK*	*RIN*	*RS*
RUK	1				
RUS	0.517464	1			
RPK	0.039711	0.002579	1		
RIN	0.293748	0.184216	0.109295	1	
RS	0.035865	-0.00118	0.037125	0.049189	1

Returns of UK and US market have higher correlation. UK market has weak correlation with SAARC markets. The higher correlation is observed between UK and Indian market whereas correlation between UK and other SAARC markets Pakistan and Sri Lanka is insignificant. The same pattern is observed for US market that has insignificant relationship with stock markets of Pakistan, India and Sri Lanka.

Table # 4.5 reports the results of correlation between UK, US and ASEAN countries i-e Indonesia, Malaysia, Philippines, Singapore and Thailand.

Table # 4.5 Correlation Matrix

Returns of UK, US and ASEAN countries

	RI	*RM*	*RP*	*RSG*	*RT*	*RUK*	*RUS*
RI	1						
RM	0.137245	1					
RP	0.079489	0.18823	1				
RSG	0.174472	0.382568	0.28824	1			
RT	0.161982	0.319036	0.242006	0.476977	1		
RUK	0.02313	0.166811	0.113495	0.369418	0.258913	1	
RUS	0.003511	0.02192	0.030241	0.203954	0.135672	0.517464	1

The results indicate that returns of UK and US are correlated withcorrelation coefficient 0.517. The correlation coefficient between Thailand and Singapore is 0.47 followed by correlation between Singapore and Malaysia. However correlation between international market i-e UK, US and ASEAN markets Indonesia, Malaysia, Philippines, and Thailand are not significant except Singapore.

Table # 4.6 presents the impact of UK market on the volatility of stock markets of Pakistan, India and Sri Lanka.

Table # 4.6

Impact of UK market on volatility of equity markets of SAARC Countries

COUNTRIES	C	ARCH	GARCH	UK
PAKISTAN	2.88E-06	0.087201	0.897619	-0.000299
Z-stats	27.43190	28.95420	340.6252	-9.153863
P value	0.0000	0.0000	0.0000	0.0000
INDIA	1.56E-06	0.051885	0.939625	-0.000699
Z-stats	13.25175	25.54074	435.1847	-17.09942
P value	0.0000	0.0000	0.0000	0.0000
SRILANKA	1.72E-06	0.170265	0.835162	-2.70E-05
Z-stats	21.22956	41.71119	246.3892	-1.743201
P value	0.0000	0.0000	0.0000	0.0813

ARCH and GARCH coefficients (0.087, 0.897) are statistically significant for Pakistan. The sum of the coefficient is 0.984 which indicates that shocks to volatility have a persistence effect on conditional variance. UK market significantly influences the volatility of Pakistani market. Positive

movements decrease the volatility of Pakistan market where as a negative movement increase the volatility of Pakistan market.

ARCH and GARCH coefficients (0.051, 0.939) are statistically significant for India. The coefficient of GARCH term is 0.93 indicating that large values of σ^2_{t-1} will be followed by large values of σ^2_t and small values of σ^2_{t-1} will be followed by small values of σ^2_t. The sum of ARCH and GARCH coefficient is 0.99 which is closer to one that means shocks to volatility have a persistence effect on conditional variance. UK market also significantly influence the volatility of Indian market. The positive return in UK reduces the volatility of Indian market and negative returns increases the volatility of Indian market. ARCH and GARCH term is found significant and positive but it has insignificant 0.6188 relationships of Sri Lankan market with return of UK Stock market.

Table # 4.7 presents (international effect) the impact of US market on the volatility of stock markets of Pakistan, India and Sri Lanka.

Table # 4.7

Impact of US market on volatility of equity markets of SAARC Countries

COUNTRIES	C	ARCH	GARCH	US
PAKISTAN	2.72E-06	0.085961	0.900047	-0.000208
Z-stats	25.03451	29.57199	340.6285	-7.225199
P value	0.0000	0.0000	0.0000	0.0000
INDIA	1.56E-06	0.049580	0.942390	-0.000664
Z-stats	13.42959	25.70044	465.9893	-16.26093

P value	0.0000	0.0000	0.0000	0.0000
SRILANKA	1.72E-06	0.170150	0.835392	8.54E-06
Z-stats	21.16	41.55	246.48	0.49
P value	0.0000	0.0000	0.0000	0.6188

With respect to Pakistan market ARCH and GARCH coefficients (0.085, 0.90) are statistically significant with US market. The sum of the coefficient is 0.9859 which indicates that shocks to volatility have a persistence effect on conditional variance. US market is significantly influence the volatility of Pakistani market. The positive movements decrease the volatility of Pakistan market where as a negative movement increase the volatility of Pakistan market.

ARCH and GARCH coefficients (0.049, 0.9423) are statistically significant for India. The coefficient of GARCH term is 0.942 indicating that large values of σ^2_{t-1} will be followed by large values of σ^2_t. The sum of ARCH and GARCH coefficient is 0.991 which is closer to one that means shocks to volatility have a persistence effect on conditional variance. US market also significantly influence the volatility of Indian market. The positive return in US reduces the volatility in Indian market and negative returns increases the volatility of Indian market. ARCH term is found significant and positive for Sri Lanka which indicates that past price behaviors influences the current volatility. The GARCH Term is also significant and positive revealing the persistence of volatility in Sri Lankan market. Again only Sri Lanka stock market has insignificant 0.6188 relationships with return of US Stock market.

Table # 4.8 reports the impact of UK market on the volatility of equity markets of Indonesia, Malaysia, Philippines, Singapore and Thailand.

Table # 4.8

Impact of UK market on volatility of equity markets of ASEAN Countries

COUNTRIES	C	ARCH	GARCH	UK
INDONESIA	1.94E-06	0.061052	0.930456	-0.000440
Z-stats	16.54506	28.56660	452.0884	-11.71256
P value	0.0000	0.0000	0.0000	0.0000
MALAYSIA	9.25E-05	0.153654	0.588153	0.002369
Z-stats	42.81203	26.12102	73.15770	35.65774
P value	0.0000	0.0000	0.0000	0.0000
PHILIPPINE	3.94E-05	0.532164	0.493389	0.000260
Z-stats	85.85506	55.95791	115.8028	7.484418
P value	0.0000	0.0000	0.0000	0.0000
SINGAPORE	5.87E-07	0.047373	0.947501	-0.000419
Z-stats	14.58588	22.24902	486.8596	-22.20772
P value	0.0000	0.0000	0.0000	0.0000
THAILAND	3.23E-06	0.056552	0.923446	-0.000650
Z-stats	30.85551	22.75927	350.6452	-12.78869

P value	0.0000	0.0000	0.0000	0.0000

ARCH and GARCH coefficients (0.061, 0.930) are statistically significant for Indonesia. The sum of the coefficient is 0.9814 which indicates that shocks to volatility have a persistence effect on conditional variance. UK market significantly influences the volatility of Indonesian market. Negative movement in UK market increases the volatility of Indonesian market.

ARCH and GARCH coefficients (0.153, 0.588) are statistically significant for Malaysia. The sum of ARCH and GARCH coefficient is 0.741. UK market is significantly influence the volatility of Malaysian market. The positive return in UK reduces the volatility of Indonesian market and negative returns increases the volatility of Indonesian market. Similar findings in the case of Philippines ARCH and GARCH coefficients (0.532, 0.493) are statistically significant. The coefficient of GARCH term is 0.493 indicating that large values of σ^2_{t-1} will be followed by large values of σ^2_t and small values of σ^2_{t-1} will be followed by small values of σ^2_t.The sum of ARCH and GARCH coefficient is 1.02 that means shocks magnifies and leads to volatility clustering. UK market also significantly influence the volatility of Philippine market. The positive return in UK reduces the volatility of Philippine market.

Singapore ARCH and GARCH coefficients (0.051, 0.939) are statistically significant. The sum of ARCH and GARCH coefficient is 0.996 which is closer to one that means shocks to volatility have a persistence effect on conditional variance. UK market is also significantly influence the volatility of Singapore market and the negative return in UK increases the volatility of Singapore market. ARCH and GARCH coefficients (0.056, 0.923) are statistically significant for Thailand. The sum of ARCH and GARCH coefficient is 0.976 which is closer to one that means shocks to volatility have a

persistence effect on conditional variance. UK market is also significantly influence the volatility of Thailand market and the negative return in UK increases the volatility of Thailand market.

Table # 4.9 reports the impact of US market on the volatility of equity markets of ASEAN countries.

Table # 4.9

Impact of US market on volatility of equity markets of ASEAN Countries

COUNTRIES	C	ARCH	GARCH	US
INDONESIA	1.88E-06	0.058433	0.933269	-0.000404
Z-stats	16.38336	28.59326	476.9119	-11.37861
P value	0.0000	0.0000	0.0000	0.0000
MALAYSIA	5.78E-05	0.130360	0.659928	0.001497
Z-stats	32.55864	22.30803	84.52059	32.55635
P value	0.0000	0.0000	0.0000	0.0000
PHILIPPINE	4.12E-05	0.531326	0.482261	-0.000857
Z-stats	90.92087	55.27521	120.3122	-9.765788
P value	0.0000	0.0000	0.0000	0.0000
SINGAPORE	5.78E-07	0.048103	0.947941	-0.000450
Z-stats	14.32191	22.63668	498.9753	-22.20683

P value	0.0000	0.0000	0.0000	0.0000
THAILAND	3.42E-06	0.059797	0.919611	-0.000471
Z-stats	27.60466	22.27213	321.1274	-8.851346
P value	0.0000	0.0000	0.0000	0.0000

Firstly ARCH and GARCH coefficients (0.058, 0.933) are statistically significant for Indonesia. The coefficient of GARCH term is 0.933 indicating that large values of σ^2_{t-1} will be followed by large values of σ^2_t and small values of σ^2_{t-1} will be followed by small values of σ^2_t.The sum of the coefficient is 0.991 which indicates that shocks to volatility have a persistence effect on conditional variance. UK market is significantly influence the volatility of Indonesian market. Negative movement in UK market increases the volatility of Indonesian market.

ARCH and GARCH coefficients (0.130, 0.659) are statistically significant for Malaysia. The sum of ARCH and GARCH coefficient is 0.790. UK market is significantly influence the volatility of Malaysian market. The positive return in UK reduces the volatility of Indonesian market and negative returns increases the volatility of Indonesian market. In the case of Philippines ARCH and GARCH coefficients (0.532, 0.482) are statistically significant. The sum of ARCH and GARCH coefficient is 1.01that means shocks magnifies and leads to volatility clustering. UK market is also significantly influence the volatility of Philippine market. The negative return in UK increases the volatility of Philippines market.

ARCH and GARCH coefficients (0.051, 0.939) are statistically significant for Singapore. The sum of ARCH and GARCH coefficient is 0.996 which is closer to one that means shocks to volatility

have a persistence effect on conditional variance. UK market is also significantly influence the volatility of Singapore market and the negative return in UK increases the volatility of Singapore market. ARCH and GARCH coefficients (0.059, 0.919) are statistically significant for Thailand. The sum of ARCH and GARCH coefficient is 0.979 which is closer to one that means shocks to volatility have a persistence effect on conditional variance. UK market is also significantly influence the volatility of Thailand market and the negative return in UK increases the volatility of Thailand market.

Table # 4.10 presents the regional effect of Pakistan stock market on the volatility of stock markets of India and Sri Lanka.

Table # 4.10

Impact of Pakistan market on volatility of equity markets of SAARC Countries

COUNTRIES	C	ARCH	GARCH	PAKISTAN
INDIA	1.49E-06	0.051972	0.940802	-0.000147
Z-stats	12.73452	26.41533	472.7179	-8.035806
P value	0.0000	0.0000	0.0000	0.0000
SRILANKA	1.74E-06	0.169779	0.835096	-1.37E-05
Z-stats	20.69165	41.58838	246.1162	-1.420678
P value	0.0000	0.0000	0.0000	0.1554

ARCH and GARCH coefficients (0.051, 0.940) are significant for India. The sum ARCH and GARCH coefficient is 0.992 which is closer to one that means shocks to volatility have a persistence effect on conditional variance. Pakistani market is significantly influence the volatility of Indian market. The positive movements decrease the volatility of Indian market where as a negative movement increase the volatility of Indian market. ARCH and GARCH term is found significant and positive but it has insignificant 0.1554 relationships of Sri Lankan market with return of Pakistan Stock market because political issues. It is isolated market.

Table # 4.11 reports the impact of Indian market on the volatility of equity markets of Pakistan and Sri Lanka.

Table # 4.11

Impact of Indian market on volatility of equity markets of SAARC Countries

COUNTRIES	C	ARCH	GARCH	INDIA
PAKISTAN	2.37E-06	0.087586	0.902097	0.000118
Z-stats	22.54036	31.29963	360.9165	10.05009
P value	0.0000	0.0000	0.0000	0.0000
SRILANKA	1.74E-06	0.168754	0.835258	3.10E-05
Z-stats	21.37832	41.29559	246.1258	3.855297
P value	0.0000	0.0000	0.0000	0.0001

ARCH and GARCH coefficients (0.087, 0.902) are significant for Pakistan. The coefficient of GARCH term is 0.902 indicating that large values of σ^2_{t-1} will be followed by large values of σ^2_t and small values of σ^2_{t-1} will be followed by small values of σ^2_t.The sum ARCH and GARCH coefficient is 0.989 which is closer to one that means shocks to volatility have a persistence effect on conditional variance. Indian market is significantly influence the volatility of Pakistani market. The positive movements of Indian market increase the volatility of Pakistan market.

ARCH and GARCH term is also found significant and positive and it has significant 0.0001 relationships of Sri Lankan market with return of Indian Stock market. The positive movements of Indian market increase the volatility of Sri Lankan market.

Table # 4.12 presents the regional effect of Sri Lanka stock market on the volatility of equity markets of Pakistan and India.

Table # 4.12

Impact of Sri Lanka market on volatility of equity markets of SAARC Countries

COUNTRIES	C	ARCH	GARCH	SRILANKA
PAKISTAN	0.000110	0.126662	0.525863	-0.001279
Z-stats	27.52693	12.55485	38.16880	-7.695587
P value	0.0000	0.0000	0.0000	0.0000
INDIA	1.32E-06	0.052552	0.941107	-4.10E-05
Z-stats	11.43611	26.93468	473.0073	-1.352881

P value	0.0000	0.0000	0.0000	0.1761

ARCH and GARCH coefficients (0.126, 0.525) are significant for Pakistan. The sum ARCH and GARCH coefficient is 0.652 which is significantly lower than 1 indicating that volatility comes down short run. Sri Lankan market is significantly influence the volatility of Pakistani market. The negative movement of Sri Lankan market increases the volatility of Pakistani market. ARCH and GARCH term is found significant and positive but it has insignificant 0.1761 relationships of Indian market with return of Sri Lanka Stock market.

Table # 4.13 reports the impact of Indonesian market on the volatility of equity markets of Malaysia, Philippines, Singapore and Thailand.

Table # 4.13

Impact of Indonesia market on volatility of equity markets of ASEAN Countries

COUNTRIES	C	ARCH	GARCH	INDONESIA
MALAYSIA	2.69E-05	0.122051	0.732691	0.000773
Z-stats	58.56846	60.54610	240.0566	35.83464
P value	0.0000	0.0000	0.0000	0.0000
PHILIPPINE	0.000190	0.295974	0.475173	0.003315
Z-stats	46.57928	13.81098	325.8134	82.41520
P value	0.0000	0.0000	0.0000	0.0000

SINGAPORE	5.08E-07	0.054189	0.943439	-0.000145
Z-stats	11.57020	23.71988	453.6565	-13.09660
P value	0.0000	0.0000	0.0000	0.0000
THAILAND	2.99E-06	0.060893	0.921614	3.53E-06
Z-stats	24.22763	22.32502	316.8858	0.142480
P value	0.0000	0.0000	0.0000	0.8867

ARCH and GARCH coefficients (0.122, 0.732) are statistically significant for Malaysia. The sum of ARCH and GARCH coefficient is 0.854 which is closer to one that means shocks to volatility have a persistence effect on conditional variance. Indonesian market is significantly influence the volatility of Malaysian market. The positive return in Indonesia reduces the volatility of Indonesian market. In the case of Philippines ARCH and GARCH coefficients (0.295, 0.475) are statistically significant. The sum of ARCH and GARCH coefficient is 0.771which is significantly lower than 1 indicating that volatility comes down short run. Indonesian market also significantly influence the volatility of Philippines market. The positive return in UK reduces the volatility of Philippines market.

Singapore ARCH and GARCH coefficients (0.054, 0.943) are statistically significant. The sum of ARCH and GARCH coefficient is 0.997 which is closer to one that means shocks to volatility have a persistence effect on conditional variance. Indonesian market is also significantly influence the volatility of Singapore market and the negative return in Indonesia increases the volatility of Singapore market. ARCH and GARCH coefficients (0.060, 0.921) are statistically significant for Thailand but returns of Indonesian market areinsignificant 0.886 relationships with Thailand market.

Table # 4.14 reports the impact of Malaysian market on the volatility of equity markets of ASEAN countries.

Table # 4.14

Impact of Malaysian market on the volatility of equity markets of ASEAN Countries

COUNTRIES	C	ARCH	GARCH	MALAYSIA
INDONESIA	1.93E-06	0.062583	0.928964	-0.000185
Z-stats	15.68729	30.53891	446.0856	-7.620325
P value	0.0000	0.0000	0.0000	0.0000
PHILIPPINE	0.000205	0.143713	0.562912	0.003191
Z-stats	48.80904	7.944584	148.8322	198.4125
P value	0.0000	0.0000	0.0000	0.0000
SINGAPORE	4.60E-07	0.060640	0.938465	0.000260
Z-stats	10.13408	31.04236	534.5212	-12.21464
P value	0.0000	0.0000	0.0000	0.0000
THAILAND	2.70E-06	0.064754	0.921249	-0.000440
Z-stats	25.63565	24.19371	346.0697	-18.21445

P value	0.0000	0.0000	0.0000	0.0000

Firstly ARCH and GARCH coefficients (0.062, 0.928) are statistically significant for Indonesia. The coefficient of GARCH term is 0.928 indicating that large values of σ^2_{t-1} will be followed by large values of σ^2_t and small values of σ^2_{t-1} will be followed by small values of σ^2_t . The sum of the coefficient is 0.991 which is closer to one indicates that shocks to volatility have a persistence effect on conditional variance. Malaysian market is significantly influence the volatility of Indonesian market. The negative movement in Malaysia market increases the volatility of Indonesia market.

In the case of Philippines ARCH and GARCH coefficients (0.143, 0.562) are statistically significant. The sum of ARCH and GARCH coefficient is 0.706 which is significantly lower than 1 indicating that volatility comes down short run. Malaysian market is also significantly influence the volatility of Philippines market. The positive returnsin Malaysia decrease the volatility of Philippines market.

ARCH and GARCH coefficients (0.060, 0.9384) are statistically significant for Singapore. The sum of ARCH and GARCH coefficient is 0.994 which is closer to one that means shocks to volatility have a persistence effect on conditional variance. Malaysian market is also significantly influence the volatility of Singapore market and the positive returns in Malaysia decrease the volatility of Singapore market. ARCH and GARCH coefficients (0.064, 0.921) are statistically significant for Thailand. The sum of ARCH and GARCH coefficient is 0.985 which is closer to one that means shocks to volatility have a persistence effect on conditional variance. Malaysia market is also significantly influence the volatility of Thailand market and the negative return in Malaysia increases the volatility of Thailand market.

Table # 4.15 shows the impact of Philippines market on the volatility of equity markets of ASEAN countries

Table # 4.15

Impact of Philippines market on the volatility of equity markets of ASEAN Countries

COUNTRIES	C	ARCH	GARCH	PHILIPPINES
INDONESIA	2.02E-06	0.064674	0.926982	-0.000173
Z-stats	15.58032	29.43043	418.3438	-8.193262
P value	0.0000	0.0000	0.0000	0.0000
MALAYSIA	0.000103	0.144803	0.555789	0.000436
Z-stats	17.38821	11.04784	25.00427	85.85697
P value	0.0000	0.0000	0.0000	0.0000
SINGAPORE	5.28E-07	0.060220	0.937929	-0.000135
Z-stats	10.89327	25.42199	456.2239	-11.39649
P value	0.0000	0.0000	0.0000	0.0000
THAILAND	3.23E-06	0.058361	0.922292	-0.000277
Z-stats	29.75910	22.91876	341.9636	-10.14493

P value	0.0000	0.0000	0.0000	0.0000

ARCH and GARCH coefficients (0.064, 0.926) are statistically significant for Indonesia. The sum of the coefficient is 0.990 which is closer to one indicates that shocks to volatility have a persistence effect on conditional variance. Philippines market is also significantly influence the volatility of Indonesian market. The negative movement in Philippines market increases the volatility of Indonesia market.

ARCH and GARCH coefficients (0.144, 0.555) are statistically significant for Malaysia. The sum of ARCH and GARCH coefficient is 0.699 which is significantly lower than 1 indicating that volatility comes down short run. Philippines market is significantly influence the volatility of Malaysian market. The positive movement in Philippines reduces the volatility of Indonesian market.

ARCH and GARCH coefficients (0.060, 0.937) are statistically significant for Singapore. The sum of ARCH and GARCH coefficient is 0.998 which is closer to one that means shocks to volatility have a persistence effect on conditional variance. Philippines market is also significantly influence the volatility of Singapore market and the negative returns in Philippines increase the volatility of Singapore market. ARCH and GARCH coefficients (0.058, 0.922) are statistically significant for Thailand. The sum of ARCH and GARCH coefficient is 0.980 which is also closer to one that means shocks to volatility have a persistence effect on conditional variance. Philippines market is also significantly influence the volatility of Thailand market and the negative return in Philippine increases the volatility of Thailand market.

Table # 4.16 reports the impact of Singapore market on the volatility of equity markets of Indonesia, Malaysia, Philippines and Thailand.

Table # 4.16

Impact of Singapore market on the volatility of equity markets of ASEAN Countries

COUNTRIES	C	ARCH	GARCH	SINGAPORE
INDONESIA	2.09E-06	0.062449	0.927957	-0.000254
Z-stats	16.19102	29.07429	422.5306	-13.20575
P value	0.0000	0.0000	0.0000	0.0000
MALAYSIA	1.06E-06	0.075689	0.923574	-0.000170
Z-stats	29.46122	27.45107	463.9311	-13.08841
P value	0.0000	0.0000	0.0000	0.0000
PHILIPPINE	3.88E-05	0.571097	0.479079	-0.000551
Z-stats	90.13803	54.33767	120.7457	-29.41286
P value	0.0000	0.0000	0.0000	0.0000
THAILAND	3.35E-06	0.061393	0.918481	-0.000344
Z-stats	34.73221	22.56777	330.1715	-13.43466
P value	0.0000	0.0000	0.0000	0.0000

ARCH and GARCH coefficients (0.062, 0.927) are statistically significant for Indonesia. The sum of the coefficient is 0.990 which is closer to one indicates that shocks to volatility have a persistence effect on conditional variance. Singapore market is also significantly influence the volatility of Indonesian market. The positive movements decrease the volatility of Indonesia market where as a negative movement increase the volatility of Indonesian market.

In the case of Malaysia ARCH and GARCH coefficients (0.075, 0.923) are statistically significant. The sum of ARCH and GARCH coefficient is 0.998 which is closer to one that means shocks to volatility have a persistence effect on conditional variance. The GARCH coefficient is 0.923 indicating that large values of σ^2_{t-1} will be followed by large values of σ^2_t and small values of σ^2_{t-1} will be followed by small values of $\sigma^2_{t.}$ Singapore market is significantly influence the volatility of Malaysian market. The negative movement increases the volatility of Malaysian market.

ARCH and GARCH coefficients (0.571, 0.479) are statistically significant for Philippines. The sum of ARCH and GARCH coefficient is 1.05 that means shocks magnifies and leads to volatility clustering. Philippines market also significantly influence the volatility of Philippine market. The negative return in Singapore market reduces the volatility of Philippine market. ARCH and GARCH coefficients (0.061, 0.918) are statistically significant for Thailand. The sum of ARCH and GARCH coefficient is 0.980 which is also closer to one that means shocks to volatility have a persistence effect on conditional variance. Singapore market is also significantly influence the volatility of Thailand market and the negative return in Singapore market increases the volatility of Thailand market.

Table # 4.17 reports the impact of Thailand market on the volatility of stock markets of Indonesia, Malaysia, Philippines and Singapore.

Table # 4.17

Impact of Thailand market on the volatility of equity markets of ASEAN Countries

COUNTRIES	C	ARCH	GARCH	THAILAND
INDONESIA	4.03E-06	0.076984	0.896835	-0.000213
Z-stats	23.75061	28.35795	317.9880	-22.71494
P value	0.0000	0.0000	0.0000	0.0000
MALAYSIA	1.08E-06	0.086769	0.915794	2.24E-06
Z-stats	29.17319	29.14863	445.6286	0.319722
P value	0.0000	0.0000	0.0000	0.7492
PHILIPPINE	4.09E-05	0.564754	0.474686	-6.17E-05
Z-stats	73.90343	56.77107	113.3386	-2.018496
P value	0.0000	0.0000	0.0000	0.0435
SINGAPORE	4.70E-07	0.059084	0.939695	-0.000143
Z-stats	10.48288	27.39369	481.7651	-9.669177
P value	0.0000	0.0000	0.0000	0.0000

Firstly ARCH and GARCH coefficients (0.076, 0.896) are statistically significant for Indonesia. The sum of the coefficient is 0.972 which is closer to one indicates that shocks to volatility have a persistence effect on conditional variance. Thailand market is also significantly influence the volatility of Indonesian market. The positive movements decrease the volatility of Indonesia market where as a negative movement increase the volatility of Indonesian market.

In the case of Malaysia ARCH and GARCH coefficients (0.075, 0.923) are statistically significant. The sum of ARCH and GARCH coefficient is 0.998 which is closer to one that means shocks to volatility have a persistence effect on conditional variance. But the returns of Thailand are insignificant relationship with Malaysia market.

ARCH and GARCH coefficients (0.564, 0.474) are statistically significant for Philippines. The sum of ARCH and GARCH coefficient is 1.03 that means shocks magnifies and leads to volatility clustering.Thailand market also significantly influence the volatility of Philippine market. The negativereturn in Thailand market increases the volatility of Philippine market.

ARCH and GARCH coefficients (0.059, 0.939) are statistically significant for Singapore. The GARCH coefficient is 0.939 indicating that large values of σ^2_{t-1} will be followed by large values of σ^2_t and small values of σ^2_{t-1} will be followed by small values of $\sigma^2_{t.}$The sum of ARCH and GARCH coefficient is 0.998 which is closer to one that means shocks to volatility have a persistence effect on conditional variance. Thailand market is also significantly influence the volatility of Singapore market and the negative returns in Thailand market increase the volatility of Singapore market.

Table # 4.18 reports the results of Mean spillover effect of UK market on SAARC countries i-e Pakistan, India and Sri Lanka.

Table # 4.18

Mean spillover from UK to SAARC markets

Items	PK	IN	S
C	0.000432	0.000265	0.000269
T Statistics	2.751360	1.755199	2.392644
P Value	0.0060	0.0793	0.0168
RUK(-1)	0.075368	0.118407	0.044845
T Statistics	4.896984	7.650288	4.074074
P value	0.0000	0.0000	0.0000
EUK	0.052534	0.377848	0.034056
T Statistics	3.414533	25.53466	3.095269
P value	0.0006	0.0000	0.0020
RPK(-1)	0.022431		
T Statistics	1.846685		
P value	0.0648		
RIN(-1)		-0.016238	
T Statistics		-1.340912	
P value		0.1800	
RS(-1)			0.147626
T Statistics			12.28446
P value			0.0000

RUK (-1) is lagged return of UK, **EUK** is shocks in UK stock market, **RPK (-1)** is lagged return of Pakistan, **RIN (-1)** is lagged return of India, **RS (-1)** is lagged return of Sri Lanka stock markets.

The returns of UK market have significant impact on Pakistan, India and Sri Lanka markets.Positive returns have positive effects and negative returns have negative effect. Shocks in UK market have also significant effect on Pakistan, India and Sri Lanka markets

Table # 4.19 reports the results of Mean spillover effect of US market on SAARC countries i-e Pakistan, India and Sri Lanka.

Table # 4.19

Mean spillover from US to SAARC markets

Items	PK	IN	S
C	0.000424	0.000247	0.000260
T Statistics	2.697209	1.604958	2.319892
P Value	0.0070	0.1085	0.0204
RUS(-1)	0.088855	0.180712	0.081009
T Statistics	5.925103	12.07028	7.569418
P value	0.0000	0.0000	0.0000
EUS	0.010341	0.244675	0.004849
T Statistics	0.687423	16.57562	0.451652
P value	0.4918	0.0000	0.6515
RPK(-1)	0.023756		
T Statistics	1.957701		

P value	0.0503		
RIN(-1)		-0.014959	
T Statistics		-1.245286	
P value		0.2131	
RS(-1)			0.149412
T Statistics			12.46977
P value			0.0000

RUS (-1) is lagged return of US and **EUS** is shocks in US stock market.

The returns of US market have significant impact on returns of markets of Pakistan, India and Sri Lanka markets. US market returns influence the returns of Pakistan, India and Sri Lanka markets. Shocks in US market have significant effect on only India market. However, shocks in US market have insignificant effect on Pakistan and Sri Lanka markets.

Table # 4.20 reports the results of Mean spillover effect of UK market on ASEAN countries i.e. Indonesia, Malaysia, Philippines, Singapore and Thailand.

Table # 4.20

Mean spillover from UK to ASEAN markets

Items	I	M	P	SG	T
C	0.000249	6.66E-05	0.000146	4.92E-05	0.000116
T Statistics	1.512352	0.477643	0.811985	0.403895	0.754885
P Value	0.1305	0.6329	0.4168	0.6863	0.4503

RUK(-1)	0.023459	0.135464	0.331830	0.178701	0.145955
T Statistics	1.455719	9.787365	18.76299	13.91051	9.371995
P value	0.1455	0.0000	0.0000	0.0000	0.0000
EUK	0.030377	0.189686	0.176632	0.400568	0.336662
T Statistics	1.885058	13.88554	10.05026	33.54302	22.37379
P value	0.0595	0.0000	0.0000	0.0000	0.0000
RI(-1)	0.082274				
T Statistics	6.784609				
P value	0.0000				
RM(-1)		-0.096011			
T Statistics		-7.965262			
P value		0.0000			
RP(-1)			-0.172779		
T Statistics			-14.73552		
P value			0.0000		
RSG(-1)				-0.005117	
T Statistics				-0.427831	
P value				0.6688	
RT(-1)					-0.009012
T Statistics					-0.745918
P value					0.4557

RUK (-1) is lagged return of UK, **EUK** is shocks in UK stock market, **RI (-1)** is lagged return of Indonesia, **RM (-1)** is return of Malaysia, **RP (-1)** is lagged return of Philippines,**RSG (-1)** is lagged return of Singapore and **RT (-1)** is lagged return of Thailand stock markets.

The returns of UK market have significant impact on Malaysia, Philippines, Singapore and Thailand markets. UK market returns influence the returns of Malaysia, Philippines, Singaporeand Thailand markets. UK market returns have insignificant impact on Indonesian market. Shocks in UK market have significant effect on Indonesia, Malaysia, Philippines, Singapore and Thailand markets.

Table # 4.21 reports the results of Mean spillover effect of US market on ASEAN countries i-eIndonesia, Malaysia, Philippines, Singapore and Thailand.

Table # 4.21

Mean spillover from US to ASEAN markets

Items	I	M	P	SG	T
C	0.000242	4.47E-05	0.000115	2.12E-05	9.43E-05
T Statistics	1.472499	0.320225	0.638209	0.169814	0.605033
P Value	0.1409	0.7488	0.5234	0.8652	0.5452
RUS(-1)	0.061293	0.217067	0.340904	0.284874	0.220163
T Statistics	3.90431	16.29033	19.82733	23.38279	14.65076
P value	0.0001	0.0000	0.0000	0.0000	0.0000
EUS	0.006489	0.041703	0.071036	0.237300	0.188695
T Statistics	0.411923	3.120768	4.120586	19.83347	12.63418
P value	0.6804	0.0018	0.0000	0.0000	0.0000
RI(-1)	0.082571				
T Statistics	6.813504				
P value	0.0000				
RM(-1)		-0.087353			

T Statistics		-7.346330			
P value		0.0000			
RP(-1)			-0.155195		
T Statistics			-13.27611		
P value			0.0000		
RSG(-1)				-0.003331	
T Statistics				-0.286399	
P value				0.7746	
RT(-1)					-0.005980
T Statistics					-0.500195
P value					0.6170

RUS(-1) is lagged return of US, **EUS** is shocks in US stock market,

The returns of US market have significant impact on Indonesia, Malaysia, Philippines, Singapore and Thailand markets. US market returns influence the returns of Malaysia, Philippines, Singaporeand Thailand markets. Shocks in US market have significant effect on Malaysia, Philippines, Singapore and Thailand markets where as US shocks have insignificant effect on Indonesia market.

Table # 4.22 reports the results of Mean spillover effect of Pakistani market on SAARC countries i-e India and Sri Lanka.

Table # 4.22

Mean spillover from Pakistan to SAARC markets

Items	IN	S
C	0.000256	0.000263
T Statistics	1.621769	2.334219
P Value	0.1049	0.0196
RPK(-1)	0.018827	0.018153
T Statistics	1.534255	2.087653
P value	0.1250	0.0369
EPK	0.109650	0.022991
T Statistics	8.980577	2.643832
P value	0.0000	0.0082
RIN(-1)	0.004777	
T Statistics	0.392352	
P value	0.6948	
RS(-1)		0.147393
T Statistics		12.24510
P value		0.0000

The returns of Pakistan market have significant impact on Sri Lanka market whereas insignificant impact on Indian market. Shocks in Pakistan market have significant effect on India and Sri Lanka markets.

Table # 4.23 reports the results of Mean spillover effect of Indian market on SAARC countries i-e Pakistan and Sri Lanka.

Table # 4.23

Mean spillover from India to SAARC markets

Items	PK	S
C	0.000428	0.000263
T Statistics	2.731843	2.339738
P Value	0.0063	0.0193
RIN(-1)	0.037310	0.030649
T Statistics	3.094643	3.557208
P value	0.0020	0.0004
EIN	0.107649	0.033256
T Statistics	8.980577	3.863774
P value	0.0000	0.0001
RPK(-1)	0.017825	
T Statistics	1.465755	
P value	0.1428	
RS(-1)		0.146528
T Statistics		12.18609
P value		0.0000

Indian market returns influence the returns of Pakistan and Sri Lanka market. Shocks in Indian market have also significant effect on Pakistan and Sri Lanka markets.

Table # 4.24 reports the results of Mean spillover effect of Sri Lanka market on SAARC countries i-e Pakistan and India.

Table # 4.24

Mean spillover from Sri Lanka to SAARC markets

Items	PK	IN
C	0.000422	0.000257
T Statistics	2.679232	1.619170
P Value	0.0074	0.1055
RS(-1)	0.043345	0.020914
T Statistics	2.575717	1.231666
P value	0.0100	0.2181
ES	0.044981	0.066337
T Statistics	2.643832	3.863774
P value	0.0082	0.0001
RPK(-1)	0.021915	
T Statistics	1.801267	
P value	0.0717	
RIN(-1)		0.008073
T Statistics		0.662812
P value		0.5075

The returns of Sri Lanka market have significant impact on Pakistan market and insignificant impact on Indian market. Sri Lankan market returns influence the returns of Pakistani market. Shocks in Sri Lankan market have also significant effect on both countries of SAARC Pakistan and India markets.

Table # 4.25 reports the results of Mean spillover effect of Indonesian market on ASEAN countries i-e Malaysia, Philippines, Singapore and Thailand.

Table # 4.25

Mean spillover from Indonesia to ASEAN markets

Items	M	P	SG	T
C	6.04E-05	0.000142	5.24E-05	0.000112
T Statistics	0.431653	0.776077	0.427979	0.729057
P Value	0.6660	0.4377	0.6687	0.4660
RI(-1)	0.042669	0.055881	0.008479	0.030905
T Statistics	4.099729	4.129763	0.925963	2.705050
P value	0.0000	0.0000	0.3545	0.0068
EI	0.159654	0.176517	0.334114	0.297650
T Statistics	14.89207	12.58317	35.60793	25.38911
P value	0.0000	0.0000	0.0000	0.0000
RM(-1)	-0.092064			
T Statistics	-7.653279			
P value	0.0000			

RP(-1)		-0.154926		
T Statistics		-13.00057		
P value		0.0000		
RSG(-1)			0.031865	
T Statistics			2.812283	
P value			0.0049	
RT(-1)				0.008885
T Statistics				0.754789
P value				0.4504

The returns of Indonesia market have significant impact on Malaysia, Philippines and Thailand markets. Indonesia returns have insignificant impact on Singapore market. Indonesia market returns influence the returns of Malaysia, Philippines and Thailand markets. Shocks in Indonesian market have significant effect on Malaysia, Philippines, Singapore and Thailand markets.

Table # 4.26 reports the results Mean spillover effect of Malaysian market on ASEAN countries i-eIndonesia, Philippines, Singapore and Thailand.

Table # 4.26

Mean spillover from Malaysia to ASEAN markets

Items	I	P	SG	T
C	0.000252	0.000151	5.56E-05	0.000122
T Statistics	1.543763	0.836697	0.451141	0.803409

P Value	0.1227	0.4028	0.6519	0.4218
RM(-1)	-0.004701	0.156059	0.003191	0.015066
T Statistics	-0.335016	9.992666	0.280555	1.104032
P value	0.7376	0.0000	0.7791	0.2696
EM	0.155638	0.272973	0.359708	0.362708
T Statistics	11.14324	17.70181	33.94967	27.84132
P value	0.0000	0.0000	0.0000	0.0000
RI(-1)	0.076129			
T Statistics	6.265249			
P value	0.0000			
RP(-1)		-0.183338		
T Statistics		-15.37903		
P value		0.0000		
RSG(-1)			0.011367	
T Statistics			0.929793	
P value			0.3525	
RT(-1)				-0.015796
T Statistics				-1.293531
P value				0.1959

The returns of Malaysia market have insignificant impact on Indonesia, Singapore and Thailand markets where as significant impact on only Indonesia market. Indonesia market returns influence the returns of Malaysia, Singapore and Thailand markets. Shocks in Malaysian market have

significant effect on all selected ASEAN countries Indonesia, Philippines, Singapore and Thailand markets.

Table # 4.27 reports the results of Mean spillover effect of Philippines market on ASEAN countries i.e. Indonesia, Malaysia, Singapore and Thailand.

Table # 4.27

Mean spillover from Philippines to ASEAN markets

Items	I	M	SG	T
C	0.000251	6.69E-05	5.45E-05	0.000120
T Statistics	1.529857	0.481588	0.427247	0.772238
P Value	0.1261	0.6301	0.6692	0.4400
RP(-1)	-0.002699	0.051909	0.020880	0.047849
T Statistics	-0.252540	5.653730	2.411387	4.616886
P value	0.8006	0.0000	0.0159	0.0000
EP	0.068192	0.162473	0.214609	0.223451
T Statistics	6.319745	17.70181	25.12973	21.65659
P value	0.0000	0.0000	0.0000	0.0000
RI(-1)	0.078946			
T Statistics	6.498350			
P value	0.0000			
RM(-1)		-0.119770		
T Statistics		-9.874603		

P value		0.0000		
RSG(-1)			-0.014949	
T Statistics			-1.207239	
P value			0.2274	
RT(-1)				-0.040722
T Statistics				-3.309779
P value				0.0009

The returns of Philippines market have significant impact on Malaysia, Singapore and Thailand markets. Malaysian market returns influence the returns of Malaysia, Singapore and Thailand markets. Returns of Indonesia have insignificant impact on only Indonesian market. Shocks in Philippines market have significant effect on Indonesia, Malaysia, Singapore and Thailand markets.

Table # 4.28 reports the results of Mean spillover effect of Singapore market on ASEAN countries i-e Indonesia, Malaysia, Philippines and Thailand.

Table # 4.28

Mean spillover from Singapore to ASEAN markets

Items	I	M	P	T
C	0.000250	6.73E-05	0.000149	0.000119
T Statistics	1.543904	0.514309	0.855147	0.844232
P Value	0.1227	0.6071	0.3925	0.3986
RSG(-1)	0.019170	0.119689	0.288749	0.088077

T Statistics	1.277273	9.273999	17.45776	6.038402
P value	0.2015	0.0000	0.0000	0.0000
ESG	0.212581	0.405362	0.398533	0.570251
T Statistics	14.36324	33.94967	25.12973	44.42325
P value	0.0000	0.0000	0.0000	0.0000
RI(-1)	0.076541			
T Statistics	6.307773			
P value	0.0000			
RM(-1)		-0.121486		
T Statistics		-10.06958		
P value		0.0000		
RP(-1)			-0.210505	
T Statistics			-17.86931	
P value			0.0000	
RT(-1)				-0.021884
T Statistics				-1.800377
P value				0.0718

The returns of Singapore market have significant impact on Malaysia, Philippines and Thailand markets. Singapore market returns influence the returns of Malaysia, Philippines and Thailand markets. Singapore market returns have insignificant impact on Indonesia market. Shocks in Singapore market have significant effect on Indonesia, Malaysia, Philippines and Thailand markets.

Table # 4.29 reports the results of Mean spillover effect of Thailand market on ASEAN countries i-eIndonesia, Malaysia, Philippines and Singapore.

Table # 4.29

Mean spillover from Thailand to ASEAN markets

Items	I	M	P	SG
C	0.000249	6.30E-05	0.000138	5.32E-05
T Statistics	1.531655	0.469644	0.781999	0.453701
P Value	0.1257	0.6386	0.4342	0.6501
RT(-1)	0.033424	0.086427	0.210963	0.021247
T Statistics	2.673154	8.033358	15.26636	2.095120
P value	0.0075	0.0000	0.0000	0.0362
ET	0.163285	0.283918	0.290670	0.396614
T Statistics	13.22113	27.84132	21.65659	44.42325
P value	0.0000	0.0000	0.0000	0.0000
RI(-1)	0.071149			
T Statistics	5.861316			
P value	0.0000			
RM(-1)		-0.114922		
T Statistics		-9.522567		
P value		0.0000		
RP(-1)			-0.202327	

T Statistics			-17.11610	
P value			0.0000	
RSG(-1)				0.011690
T Statistics				0.959076
P value				0.3376

The returns of Thailand market have significant impact on all ASEAN countries Indonesia, Malaysia, Philippines and Singapore markets. Thailand market returns influence the returns of Indonesia, Malaysia, Philippines and Singapore markets. Shocks in Thailand market have also significant effect on all ASEAN countries Indonesia, Malaysia, Philippines and Singapore markets.

Table # 4.30 reports the results of asymmetric behavior of UK market on SAARC countries i-e Pakistan, India and Sri Lanka.

Table # 4.30

Asymmetric spillover from UK to SAARC equity markets

Items	PK	IN	S
C	0.000505	0.000467	0.000480
T Statistics	2.391085	2.196736	3.175798
P Value	0.0168	0.0281	0.0015
PUK(-1)	0.053594	0.013915	0.052573
T Statistics	1.921321	0.492385	2.635387
P value	0.0547	0.6225	0.0084

NUK(-1)	0.090377	0.162968	-0.019523
T Statistics	3.152153	5.612714	-0.952314
P value	0.0016	0.0000	0.3410
EPUK	-0.061305	-0.059344	-0.066175
T Statistics	-2.440295	-2.342381	-3.680942
P value	0.0147	0.0192	0.0002
ENUK	0.016798	0.023634	0.055990
T Statistics	0.703468	0.981904	3.275005
P value	0.4818	0.3262	0.0011
RPK(-1)	0.021781		
T Statistics	1.793157		
P value	0.0730		
RIN(-1)		-0.005369	
T Statistics		-0.432931	
P value		0.6651	
RS(-1)			0.145252
T Statistics			12.06017
P value			0.0000

PUK (-1) is positive one period lagged return of UK, **NUK (-1)** is negative one period lagged return of UK, **EPUK** is positive shocks in UK, **ENUK** is negative shocks in UK stock market

The presence of asymmetries in SAARC stock markets to upturns (positive one-period lagged returns) and downturns (negative one-period lagged returns) as well as positive shocks (positive present residuals) and negative shocks (negative present residuals) in the UK and SAARC markets.

Positive and negative movements in UK market have significant impact on Pakistani market. The size of coefficient of NUK (-1) is 0.09 which is greater the size of PUK (-1) which is 0.05. This suggests that decrease in UK market has a much greater impact then increase of the same magnitude on Pakistan market. The size of ENUK (-1) is insignificant indicating the negative shocks in UK has no effect on Pakistan market where as positive shocks have significant effect.

For Indian market only negative return of UK are found to influence Indian market returns. In Indian market EPUK (-1) has significant effect on Indian market where ENUK (-1) is found insignificant indicating that negative shocks of UK market has no effect on Indian market.

On the other hand only positive returns of UK influence the Sri Lankan market where no effect of negative return is observed. For Sri Lanka market, both positive and negative shocks are significant but negative shocks have more effect on Sri Lankan market.

Table # 4.31 reports the results of asymmetric behavior of US market on SAARC countries i-e Pakistan, India and Sri Lanka.

Table # 4.31

Asymmetric spillover from US to SAARC equity markets

Items	PK	IN	S
C	0.000718	0.000644	0.000351
T Statistics	3.273442	2.933580	2.233083
P Value	0.0011	0.0034	0.0256
PUS(-1)	0.077110	0.130086	0.044619

T Statistics	3.195694	5.366821	2.581885
P value	0.0014	0.0000	0.0098
NUS(-1)	0.097108	0.227877	-0.014225
T Statistics	4.203634	9.753115	-0.856925
P value	0.0000	0.0000	0.3915
EPUS	-0.050153	-0.023490	-0.043949
T Statistics	-2.032092	-0.950563	-2.485330
P value	0.0422	0.3419	0.0130
ENUS	0.027406	0.011271	0.041471
T Statistics	1.189138	0.488452	2.511467
P value	0.2344	0.6252	0.0120
RPK(-1)	0.022914		
T Statistics	1.887702		
P value	0.0591		
RIN(-1)		-0.017704	
T Statistics		-1.442669	
P value		0.1492	
RS(-1)			0.146542
T Statistics			12.11426
P value			0.0000

PUS (-1) is positive one period lagged return of US, **NUS (-1)** is negative one period lagged return of US, **EPUS** is positive shocks in US, **ENUS** is negative shocks in UK stock market

Positive and negative movements in US market have significant impact on Pakistani market. The size of coefficient of NUS (-1) is 0.09 which is greater the size of PUS (-1) which is 0.07. This suggests that decrease in US market has a much greater impact then increase of the same magnitude on Pakistan market. The size of ENUS (-1) is insignificant indicating the negative shocks in US has no effect on Pakistan market where as positive shocks have significant effect.

Both negative and positive returns of US market have significant impact on Indian market. So, both positive and negative returns of US market influence the returns of Indian market. The size of coefficient of NUS (-1) is 0.22 which is greater the size of PUS (-1) which is 0.13. This suggests that decrease in US market has a much greater impact then increase of the same magnitude on Indian market. We also found thatpositive and negative shocks EPUS (-1) and ENUS (-1) have insignificant effect on Indian market.

Only positive returns of US influence the Sri Lankan market where no effect of negative return is observed. For Sri Lanka market, both positive and negative shocks are significant but negative shocks have more effect on Sri Lankan market.

Table # 4.32 reports the results of asymmetric behavior of UK market on ASEAN countries i-eIndonesia, Malaysia, Philippines, Singapore and Thailand.

Table # 4.32

Asymmetric spillover from UK to ASEAN equity markets

Items	I	M	P	SG	T
C	1.064923	1.064896	1.065803	1.065714	1.063850
T Statistics	0.791996	0.792295	0.793039	0.792968	0.791371

P Value	0.4284	0.4282	0.4278	0.4278	0.4288
PUK(-1)	5.413440	5.104132	3.215368	4.776060	4.754549
T Statistics	0.030479	0.028718	0.018047	0.026811	0.026730
P value	0.9757	0.9771	0.9856	0.9786	0.9787
NUK(-1)	-170.1145	-170.4360	-172.9120	-170.6810	-170.6046
T Statistics	-0.931515	-0.932151	-0.941804	-0.931697	-0.933113
P value	0.3516	0.3513	0.3463	0.3515	0.3508
EPUK	-65.38728	-65.20185	-64.40030	-65.15771	-64.69420
T Statistics	-0.408764	-0.407393	-0.402224	-0.407018	-0.403456
P value	0.6827	0.6837	0.6875	0.6840	0.6866
ENUK	-40.72116	-40.88966	-41.37554	-40.91180	-40.97389
T Statistics	-0.267625	-0.268746	-0.271949	-0.268757	-0.269265
P value	0.7890	0.7881	0.7857	0.7881	0.7877
RI(-1)	2.084746				
T Statistics	0.028242				
P value	0.9775				
RM(-1)		4.130069			
T Statistics		0.048183			
P value		0.9616			
RP(-1)			9.994714		
T Statistics			0.151111		
P value			0.8799		
RSG(-1)				4.310661	
T Statistics				0.046606	
P value				0.9628	

RT(-1)					5.327956
T Statistics					0.069493
P value					0.9446

The Positive and negative movements in UK market have insignificant impact on Indonesia, Malaysia, Philippines, Singapore and Thailand markets. We also found that both positive and negative shocks are also insignificant effect on Indonesia, Malaysia, Philippines, Singapore and Thailand markets.

Table # 4.33 reports the regional effect and results of asymmetric behavior of US market on ASEAN countries.

Table # 4.33

Asymmetric spillover from US to ASEAN equity markets

Items	I	M	P	SG	T
C	1.431378	1.429170	1.427064	1.428397	1.427935
T Statistics	1.025301	1.024114	1.022449	1.023370	1.022938
P Value	0.3053	0.3058	0.3066	0.3062	0.3064
PUS(-1)	-53.17242	-54.55147	-55.89718	-55.11810	-54.45091
T Statistics	-0.345782	-0.352206	-0.360187	-0.353875	-0.352213
P value	0.7295	0.7247	0.7187	0.7234	0.7247
NUS(-1)	-87.01651	-88.42518	-90.05919	-89.30345	-88.46310
T Statistics	-0.590792	-0.596151	-0.604493	-0.595639	-0.596935
P value	0.5547	0.5511	0.5455	0.5514	0.5506
EPUS	-91.27485	-90.94030	-90.92721	-90.97271	-90.80710

T Statistics	-0.580566	-0.578110	-0.578181	-0.578306	-0.576955
P value	0.5616	0.5632	0.5632	0.5631	0.5640
ENUS	82.11624	81.92925	81.69572	81.92078	81.89430
T Statistics	0.558726	0.557913	0.556215	0.557833	0.557623
P value	0.5764	0.5769	0.5781	0.5770	0.5771
RI(-1)	-0.325683				
T Statistics	-0.004408				
P value	0.9965				
RM(-1)		6.560567			
T Statistics		0.075474			
P value		0.9398			
RP(-1)			8.715184		
T Statistics			0.130575		
P value			0.8961		
RSG(-1)				7.570378	
T Statistics				0.079824	
P value				0.9364	
RT(-1)					6.506602
T Statistics					1.022938
P value					0.3064

The Positive and negative movements in US market have insignificant impact on Indonesia, Malaysia, Philippines, Singapore and Thailand markets. We also found that both positive and negative shocks are also insignificant effect on Indonesia, Malaysia, Philippines, Singapore and Thailand markets.

Table # 4.34 reports the regional effect and results of asymmetric behavior of Pakistan market on SAARC countries i-e India and Sri Lanka

Table # 4.34

Asymmetric spillover from Pakistan to SAARC equity markets

Items	IN	S
C	0.000275	0.000294
T Statistics	1.289056	1.941269
P Value	0.1974	0.0523
PPK(-1)	0.013950	0.030012
T Statistics	0.702699	2.140349
P value	0.4823	0.0324
NPK(-1)	0.021510	0.004691
T Statistics	1.148450	0.354047
P value	0.2508	0.7233
EPPK	0.038097	0.003922
T Statistics	1.882937	0.273500
P value	0.0598	0.7845
ENPK	0.035972	0.037219
T Statistics	1.938618	2.829876
P value	0.0526	0.0047
RIN(-1)	0.008930	

T Statistics	0.729844	
P value	0.4655	
RS(-1)		0.147749
T Statistics		12.27118
P value		0.0000

PPK (-1) is positive one period lagged return, **NPK (-1)** is negative one period lagged return of Pakistan, **EPPK** is positive shocks, **ENPK** is negative shocks in Pakistan stock market

The Positive and negative movements in Pakistan market have insignificant impact on Indian market. The size of negative shocks ENPK (-1) and the size of positive shocks EPPK (-1) have significant effect on Indian market. For Sri Lanka market, only positive movements in Pakistan market have significant impact whereas negative movements have insignificant impact on Sri Lanka market. Positive shocks have insignificant effect but negative shocks are more effect on Sri Lankan market.

Table # 4.35 reports the results of asymmetric behavior of Indian market on SAARC countries i-e Pakistan and Sri Lanka.

Table # 4.35

Asymmetric spillover from India to SAARC equity markets

Items	PK	S
C	0.000581	0.000467
T Statistics	2.583731	2.905470
P Value	0.0098	0.0037

PIN(-1)	0.036222	0.035429
T Statistics	1.869302	2.560431
P value	0.0616	0.0105
NIN(-1)	0.038059	0.025353
T Statistics	2.004556	1.877592
P value	0.0451	0.0605
EPIN	-0.000831	-0.020964
T Statistics	-0.042455	-1.498495
P value	0.9661	0.1341
ENIN	0.037516	0.041898
T Statistics	1.991784	3.111888
P value	0.0464	0.0019
RPK(-1)	0.019408	
T Statistics	1.584487	
P value	0.1131	
RS(-1)		0.145394
T Statistics		12.06978
P value		0.0000

PIN (-1) is positive one period lagged return, **NIN (-1)** is negative one period lagged return of India, **EPIN** is positive shocks, **ENIN** is negative shocks in India stock market

Only negative movements in Indian market have significant impact on Pakistani market. The size of negative shocks has significant effect on Pakistani market. For Sri Lanka market, only positive

movements in Indian market have significant impact whereas negative movements have insignificant impact on Sri Lankan market. Only negative shocks are effect on Sri Lankan market.

Table # 4.36 reports the results of asymmetric behavior of Sri Lanka market on SAARC countries i-e Pakistan and India.

Table # 4.36

Asymmetric spillover from Sri Lanka to SAARC equity markets

Items	PK	IN
C	0.000300	0.000307
T Statistics	1.496081	1.516096
P Value	0.1347	0.1295
PS(-1)	0.083151	0.021266
T Statistics	3.285603	0.831900
P value	0.0010	0.4055
NS(-1)	0.002746	0.025514
T Statistics	0.103366	0.952164
P value	0.9177	0.3410
EPS	0.020708	0.053544
T Statistics	0.788576	2.020984
P value	0.4304	0.0433
ENS	0.048377	0.070553
T Statistics	1.817702	2.627818

P value	0.0692	0.0086
RPK(-1)	0.022565	
T Statistics	1.855122	
P value	0.0636	
RIN(-1)		0.009155
T Statistics		0.751566
P value		0.4523

PS (-1) is positive one period lagged return, **NS (-1)** is negative one period lagged return of India, **EPS** is positive shocks, **ENS** is negative shocks in India stock market

Only positive movements in Sri Lanka market have significant impact on Pakistani market where as negative movements have insignificant impact on Pakistani markets. The size of negative shocks ENS has significant effect on Pakistani market. For Indian market, positive and negative movements in Sri Lankan market have insignificant impact whereas both negative and positive shocks are effect on Indian market.

Table # 4.37 reports the results of asymmetric behavior of Indonesia market on ASEAN countries i-e Malaysia, Philippines, Singapore and Thailand.

Table # 4.37

Asymmetric spillover from Indonesia to ASEAN equity markets

Items	M	P	SG	T
C	0.000113	0.001112	0.000553	0.000509
T Statistics	0.563884	4.253269	2.937706	2.250162

P Value	0.5729	0.0000	0.0033	0.0245
PI(-1)	0.081150	0.008324	0.013463	0.062994
T Statistics	4.898548	0.386636	0.864886	3.370388
P value	0.0000	0.6990	0.3871	0.0008
NI(-1)	0.014288	0.110084	0.019630	0.017739
T Statistics	0.880240	5.235713	1.289983	0.971521
P value	0.3788	0.0000	0.1971	0.3313
EPI	-0.030162	-0.059086	-0.030808	-0.067804
T Statistics	-1.706740	-2.570024	-1.860822	-3.408179
P value	0.0879	0.0102	0.0628	0.0007
ENI	0.048781	0.094777	0.094121	0.079984
T Statistics	2.870411	4.285132	5.906206	4.180045
P value	0.0041	0.0000	0.0000	0.0000
RM(-1)	-0.089679			
T Statistics	-7.333728			
P value	0.0000			
RP(-1)		-0.155463		
T Statistics		-12.90952		
P value		0.0000		
RSG(-1)			0.042712	
T Statistics			3.464393	
P value			0.0005	
RT(-1)				0.007462

T Statistics				0.606116
P value				0.5445

PI (-1) is positive one period lagged return, **NI (-1)** is negative one period lagged return of Indonesia, **EPI** is positive shocks, **ENI** is negative shocks in Indonesia stock market

The negative movements in Indonesia market have insignificant impact on Malaysia market where as positive movements have significant impact on Malaysia market. Only negative shocks are also significant effect on Malaysia market.

In the case of Philippines market only negative movements in Indonesia market have significant impact on Philippines market where as positive movements have insignificant impact on Philippines market. The size of negative and as well as positive shocks has significant effect on Philippines market. For Singapore market, no positive and negative movements in Indonesian market have significant impact whereas only negative shocks are effect on Singapore market.

The positive movements in Indonesia market have significant impact on Thailand market where as negative movements have insignificant impact on Thailand market. Negative shocks are more effect on Thailand market.

Table # 4.38 reports the results of asymmetric behavior of Malaysia market on ASEAN countries i-e Indonesia, Philippines, Singapore and Thailand.

Table # 4.38

Asymmetric spillover from Malaysia to ASEAN equity markets

Items	I	P	SG	T
C	0.000218	0.000352	7.95E-06	0.000382
T Statistics	1.100656	1.593794	0.049796	1.988797
P Value	0.2711	0.1110	0.9603	0.0468
PM(-1)	-0.013884	0.115130	-0.015690	-0.030049
T Statistics	-0.667237	4.939749	-0.907734	-1.460626
P value	0.5046	0.0000	0.3641	0.1442
NM(-1)	-0.001700	0.187075	-0.016081	0.031897
T Statistics	-0.078044	7.635344	-0.882960	1.477691
P value	0.9378	0.0000	0.3773	0.1395
EPM	0.073033	0.076536	0.099083	0.081347
T Statistics	3.454324	3.238035	5.803838	3.961066
P value	0.0006	0.0012	0.0000	0.0001
ENM	0.048978	0.082078	0.082137	0.118861
T Statistics	2.271826	3.405702	4.717391	5.677907
P value	0.0231	0.0007	0.0000	0.0000
RI(-1)	0.082423			
T Statistics	6.733717			
P value	0.0000			
RP(-1)		-0.171833		

T Statistics		-14.12012		
P value		0.0000		
RSG(-1)			0.054560	
T Statistics			4.160196	
P value			0.0000	
RT(-1)				0.013951
T Statistics				1.088681
P value				0.2763

PM (-1) is positive one period lagged return, **NM (-1)** is negative one period lagged return of Malaysia, **EPM** is positive shocks, **ENM** is negative shocks in Malaysia stock market

The positive and negative movements in Malaysia market have insignificant impact on Indonesia market. Positive and negative shocks are significant effect on Malaysia market. In the case of Philippines market negative movements in Indonesia market have significant impact on Philippines market and also positive movements have significant impact on Philippines market. The negative and as well as positive shocks has significant effect on Philippines market. The size of negative shocks is greater than positive shocks.

For Singapore market, positive and negative movements in Malaysia market have insignificant impact on Singapore market. Positive and negative shocks are significant effect on Singapore market. The positive and negative movements in Malaysia market have insignificant impact on Thailand market. Positive and negative shocks are significant effect on Thailand market.

Table # 4.39 reports the results of asymmetric behavior of Philippines market on ASEAN countries i-e Indonesia, Malaysia, Singapore and Thailand.

Table # 4.39

Asymmetric spillover from Philippines to ASEAN equity markets

Items	I	M	SG	T
C	0.000320	6.05E-05	7.34E-06	0.000165
T Statistics	1.577121	0.347254	0.045371	0.844834
P Value	0.1148	0.7284	0.9638	0.3982
PP(-1)	-0.000601	0.055244	0.011655	0.030320
T Statistics	-0.037583	4.001081	0.902692	1.957389
P value	0.9700	0.0001	0.3667	0.0503
NP(-1)	-0.004540	0.045642	0.012857	0.054471
T Statistics	-0.280851	3.263585	0.974494	3.456828
P value	0.7788	0.0011	0.3298	0.0005
EPP	0.035363	0.086144	0.143524	0.152445
T Statistics	2.083153	5.912477	10.61403	9.359324
P value	0.0373	0.0000	0.0000	0.0000
ENP	0.058245	0.093874	0.130114	0.143160
T Statistics	3.663779	6.876108	10.27490	9.382949
P value	0.0003	0.0000	0.0000	0.0000
RI(-1)	0.082175			
T Statistics	6.761964			
P value	0.0000			
RM(-1)		-0.098416		

T Statistics		-8.033665		
P value		0.0000		
RSG(-1)			0.042185	
T Statistics			3.380829	
P value			0.0007	
RT(-1)				0.001514
T Statistics				0.122474
P value				0.9025

PP (-1) is positive one period lagged return, **NP (-1)** is negative one period lagged return of Philippines, **EPP** is positive shocks, **ENP** is negative shocks in Philippines stock market

The positive and negative movements in Philippines market have insignificant impact on Indonesia market. Positive and negative shocks are significant effect on Malaysian market. In the case of Malaysia market both negative and positive movements in Philippines market have significant impact on Malaysia market. The negative and as well as positive shocks has significant effect on Malaysia market.

For Singapore market, positive and negative movements in Philippines market have insignificant impact on Singapore market. While positive and negative shocks are significant effect on Singapore market. The positive and negative movements in Philippines market have significant impact on Thailand market. Positive and negative shocks are also significant effect on Thailand market.

Table 4.40 reports the results of asymmetric behavior of Singapore market on ASEAN countries i-e Indonesia, Malaysia, Philippines and Thailand.

Table # 4.40

Asymmetric spillover from Singapore to ASEAN equity markets

Items	I	M	P	T
C	0.000154	0.000105	0.000565	0.000443
T Statistics	0.685068	0.544350	2.273085	2.029469
P Value	0.4933	0.5862	0.0231	0.0424
PSG(-1)	0.077836	0.171281	0.276699	0.099323
T Statistics	3.267233	8.190594	10.47887	4.104121
P value	0.0011	0.0000	0.0000	0.0000
NSG(-1)	-0.045228	0.065494	0.291588	0.065569
T Statistics	-1.911095	3.112572	10.91988	2.700272
P value	0.0560	0.0019	0.0000	0.0069
EPSG	-0.024915	-0.069449	-0.042318	-0.061694
T Statistics	-1.044824	-3.387324	-1.606497	-2.662163
P value	0.2961	0.0007	0.1082	0.0078
ENSG	0.065807	0.046989	0.076278	0.075581
T Statistics	2.783351	2.313480	2.922024	3.291376
P value	0.0054	0.0207	0.0035	0.0010
RI(-1)	0.078294			
T Statistics	6.358063			
P value	0.0000			
RM(-1)		-0.125313		

T Statistics		-9.608442		
P value		0.0000		
RP(-1)			-0.208588	
T Statistics			-16.91220	
P value			0.0000	
RT(-1)				-0.019106
T Statistics				-1.383171
P value				0.1667

PSG (-1) is positive one period lagged return, **NSG (-1)** is negative one period lagged return of Singapore, **EPSG** is positive shocks, **ENSG** is negative shocks in Singapore stock market

The positive and negative movements in Singapore market have significant impact on Indonesia market. Only negative shocks are significant effect on Indonesian market. In the case of Malaysia market onlynegative movements in Singapore market have significant impact on Malaysian market. The negative and as well as positive shocks in Singapore market has significant effect on Malaysian market.

For Philippines market, positive and negative movements in Singapore market have significant impact on Philippines market. While only negative shocks are significant effect on Philippines market. The positive and negative movements in Singapore market have significant impact on Thailand market. Positive and negative shocks are also significant effect on Thailand market**.**

Table # 4.41 reports the results of asymmetric behavior of Thailand market on ASEAN countries i-e Indonesia, Malaysia, Philippines and Singapore.

Table # 4.41

Asymmetric spillover from Thailand to ASEAN equity markets

Items	I	M	P	SG
C	-0.000149	-0.000207	0.000437	-4.57E-05
T Statistics	-0.657975	-1.058378	1.741487	-0.249273
P Value	0.5106	0.2899	0.0816	0.8032
PT(-1)	0.063676	0.113358	0.214595	0.042266
T Statistics	3.269229	6.676485	9.895822	2.558361
P value	0.0011	0.0000	0.0000	0.0105
NT(-1)	0.000147	0.057994	0.192929	-0.033367
T Statistics	0.007374	3.284996	8.612204	-1.951339
P value	0.9941	0.0010	0.0000	0.0511
EPT	0.061759	0.010368	-0.001545	0.021575
T Statistics	3.155213	0.614390	-0.071180	1.361854
P value	0.0016	0.5390	0.9433	0.1733
ENT	0.018339	-0.006989	0.100358	0.070030
T Statistics	0.920737	-0.406948	4.542070	4.343111
P value	0.3572	0.6841	0.0000	0.0000
RI(-1)	0.076640			
T Statistics	6.243915			
P value	0.0000			
RM(-1)		-0.112966		

T Statistics		-8.861776		
P value		0.0000		
RP(-1)			-0.192078	
T Statistics			-15.74533	
P value			0.0000	
RSG(-1)				0.045490
T Statistics				3.296420
P value				0.0010

PT (-1) is positive one period lagged return, **NT (-1)** is negative one period lagged return of Thailand, **EPT** is positive shocks, **ENT** is negative shocks in Thailand stock market

The positive movements in Thailand market have significant impact on Indonesia market and negative movements have insignificant impact on Indonesia market. Only positive shocks are significant effect on Indonesian market. In the case of Malaysia market positive and negative movements in Thailand market have significant impact on Malaysian market. The negative and as well as positive shocks in Thailand market has insignificant effect on Malaysian market.

For Philippines market, positive and negative movements in Thailand market have significant impact on Philippines market. While only negative shocks in Thailand market are significant effect on Philippines market. The positive and negative movements in Thailand market have significant impact on Singapore market while only negative shocks in Thailand are significant effect on Singapore market.

CHAPTER # 5

5.1 Conclusion and Discussion

There are two sections in this study. Firstly to investigate the (Internationalization) impact of UK and US market returns on the returns and volatility of SAARC and ASEAN stock markets. Secondly to examines the existence of mean and volatility spillover (regionalization) between SAARC and ASEAN countries. The study also examines the impact of positive and negative behavior of each market on other markets. The study uses GARCH model to check the volatility spillover effect.

In the Internationalization context, the UK and U.S markets are observed to influence in SAARC stock markets. UK and US (returns) markets effect the volatility of Pakistani and Indian equity markets and the report high volatility when UK and U.S returns are negative. Only Sri Lanka stock market has insignificant relationship because Sri Lankan stock market is small market as compared to Pakistani and Indian stock market. For ASEAN markets, UK and US markets have a similar impact on ASEAN stock markets. UK (returns) market effect the volatility of Indonesia, Singapore and Thailand equity markets and it increase the volatility when UK returns are negative. UK (returns) market also effect the volatility of Malaysia and Philippines equity markets and it decreases the volatility when returns are positive. US (returns) market effect the volatility of Indonesia, Philippines, Singapore and Thailand equity markets but its effect increase the volatility when returns are negative. US market also effect the volatility of Malaysia equity market and it decrease the volatility when returns are positive. So, we conclude that returns of international markets have significant impact on volatility of SAARC and ASEAN countries except Sri Lanka stock markets.

Reasons of volatility spillover are integration of international markets with SAARC and ASEAN markets and have cross border flows and economic integration.

In the Regionalization context (SAARC), the study finds that Pakistan (returns) market effect the volatility of Indian equity market. Increase volatility is observed when returns are negative. Sri Lanka stock market has insignificant relationship with Pakistan market. India (returns) market influences the volatility of Pakistan and Sri Lanka equity markets and it decrease the volatility when returns are positive Sri Lanka market influence the volatility of Pakistan market and it increase the volatility when returns are negative. So, it is concluded that volatility spillover shocks exists between SAARC countries.

In the Regionalization context (ASEAN), the study provide that Indonesia (returns) market has impact on the volatility of selected ASEAN countries stock markets except Thailand and it decrease, the volatility of Malaysia and Philippines when returns are positive and increase, the volatility of Singapore when returns are negative. Malaysian market have impact on the volatility of all ASEAN countries stock markets and it increase the volatility of Indonesia and Thailand when returns are negative and decrease the volatility of Philippines and Singapore when returns are positive. In the case of Philippines market influences the volatility of all selected ASEAN countries stock market and it increase the volatility of Indonesia, Singapore and Thailand when returns are negative and only decrease the volatility of Malaysia when returns are positive. Amazing results are found in the case of Singapore (returns) market effects the volatility of all ASEAN countries stock markets and it increase the volatility of Indonesia, Malaysia, Philippines and Thailand when returns are negative. Thailand market effect the volatility of all ASEAN countries stock markets except Malaysia and it increase the volatility of Indonesia, Philippines and Singapore when returns are negative. So, it is concluded that volatility spillover exists between ASEAN countries.

Existence of volatility spillover among SAARC and ASEAN stock markets may be due to regional trade and investments. Integration and co-movement may also be a reason to volatility spillover.

The results of mean spillover of international markets on SAARC and ASEAN markets indicate that UK returns have significant impact on all SAARC and ASEAN markets except Indonesian market. US returns have significant impact on all SAARC and ASEAN markets i-e Pakistan, India, Sri Lanka, Indonesia, Malaysia, Philippines, Singapore and Thailand. UK shocks have significant effect on all SAARC and ASEAN markets where as US shocks have significant effect on only Indian market and have insignificant effect on Pakistan and Sri Lanka markets. In ASEAN markets, US shocks have significant effect on all ASEAN markets except Indonesia market.

With the results of mean spillover (regional level) with SAARC markets. Pakistan returns have significant impact on only Sri Lanka and insignificant impact on Indian market. Pakistan shocks have significant effect on Indian and Sri Lankan markets. Indian returns have significant impact on both markets of Pakistan and Sri Lanka and Indian shocks are also effects both markets. Sri Lankan returns have significant impact on Pakistani market and insignificant impact on Indian market. Sri Lanka shocks have significant effect Pakistani and Sri Lankan markets.

Results of mean spillover (regional level) between ASEAN markets indicate that Indonesia returns have significant impact on Malaysia, Philippines and Thailand and insignificant impact on only Singapore. Indonesia shocks have significant effect on all ASEAN markets i-e Malaysia, Philippines, Singapore and Thailand. Malaysia returns have significant impact on Indonesia, Singapore and Thailand markets and insignificant impact on only Philippines market. Malaysia shocks have significant effect on all ASEAN markets. Philippines returns have significant impact on Malaysia, Singapore and Thailand markets and insignificant impact on only Indonesian market. Philippines shocks have significant effect on all ASEAN markets. Singapore returns have significant impact on Malaysia, Philippines and Thailand markets and insignificant impact on only Indonesian market. Singapore shocks have significant effect on all ASEAN markets. Thailand returns and

shocks have significant impact on all ASEAN markets i-e Indonesia, Malaysia, Philippines and Singapore markets. So, we conclude that Malaysia, Philippines, Singapore and Thailand shocks have significant effect between ASEAN markets.

These markets are associated with economically, financially, politically and culturally with each other. Shocks are transferred and create significant effect on SAARC and ASEAN in the context of international level as well as regional level. Shocks are transferred because of co-movement, high oil prices, exchange rates, inflation and any disasters. With the results, we can say that negative shocks more quickly transferred as compared to positive shocks.

Results of asymmetric behavior of international markets on SAARC and ASEAN markets shows that positive movements in UK market have significant impact on Pakistan and Sri Lanka markets and negative movements in UK and US market have significant impact on Pakistan and India markets. Positive shocks in UK market have significant effect on all SAARC markets whereas negative shocks in UK and US market have only significant effect on Sri Lankan market. Positive movements in US market have significant impact on all SAARC markets. Positive shocks in US market have significant effect on Pakistan and Sri Lanka markets.

Amazing results are found in the asymmetric behavior of UK and US markets on ASEAN markets. Positive and negative movements in UK and US markets have insignificant impact on all ASEAN markets even positive and negative shocks in UK and US have insignificant effect on all ASEAN markets.

Results of symmetric behavior (regional level) between SAARC markets indicate that Positive movements in Pakistan and India markets have significant impact on only Sri Lanka market and there is no negative movements have impact on India and Sri Lanka markets. Positive shocks in

Pakistan have significant effect on only Indian market where as negative shocks have significant effect on markets of India and Sri Lanka .Negative movements in India market have significant impact on only Pakistan market. Positive shocks in India market have no significant effect on Pakistan and Sri Lanka whereas negative shocks have significant effect on markets of Pakistan and Sri Lanka. Positive movements in prices of Sri Lankan market have significant impact on only Pakistan market and no negative movements have impact on return of Pakistan and India markets. Positive and negative shocks in Sri Lanka market have significant effect on only Indian market.

Results of symmetric behavior (regional level) between ASEAN markets indicate that Positive movements in Indonesia market have significant impact on returns of Malaysia and Thailand markets and negative movements have significant impact on only Singapore market. Positive shocks in Indonesia have significant effect on Philippines and Thailand whereas negative shocks have significant effects on all ASEAN markets. Positive and negative movements in Malaysia market have significant impact on only Philippines market. Positive and negative shocks in Indonesia market have significant effect on all ASEAN markets.

Positive and negative movements in Philippines market have significant impact on Malaysia and Thailand markets. Positive and negative shocks in Philippines market have significant effect on all ASEAN markets. Positive and negative movements in Singapore market have significant impact on all ASEAN markets. Positive shocks in Singapore market have significant effect on Malaysia and Thailand markets where as negative shocks in Singapore market has significant effects on all ASEAN markets. Positive movements in Thailand market have significant impact on all ASEAN markets where as negative movements in Thailand market have significant effect on Malaysia, Philippines and Singapore markets. Positive shocks in Thailand market have significant effect on

only Indonesia market where as negative shocks in Thailand market have significant effect on Philippines and Singapore markets.

5.2 Recommendations and Policy Implications

Created on this learning it is recommended that investors must monitor the UK and US countries because returns of these markets have significant impact on volatility of SAARC and ASEAN countries except Sri Lanka market and shocks in UK and US markets have significant effect on SAARC and ASEAN markets. Positive and negative movements in any market have impact on other markets of SAARC and ASEAN. Shocks also effect on ASIAN markets but negative shocks have more effect than positive shocks. Investor also kept in mind that regional volatility spillover also exits between SAARC and ASEAN markets. The investor should be vigilant that international markets may influence the volatility of SAARC and ASEAN markets. Moreover, regional spillover is significant in ASEAN region so, any contagious movements may effects whole region. Relatively lower mean spillover is observed in SAARC region and it may be due to political dynamics of this region.

5.3 Limitations or Future research

The study focused on ASIAN countries and chosen only two regions SAARC and ASEAN countries stock markets and two advanced stock markets (UK and US) are explored. Only three countries are selected from SAARC (Pakistan, India and Sri Lanka) and five countries are chosen from ASEAN (Indonesia, Malaysia, Philippines, Singapore, and Thailand). In future large set of countries may be exceeding.

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