CHANGING DYNAMICS OF MARKETS TRANSITION PATTERNS IN THE GLOBAL PERSPECTIVE: (A CASE OF MARKETS OF UNITED STATES OF AMERICA, CHINA AND SOUTH ASIA)

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ABSTRACT

This study examines the co integration and changing patterns of markets of emerging countries of South Asia and stock markets of developed countries. To represent the impact and influence of developed countries over stock markets of South Asian countries pre- and post-crisis of 2007-08 the data of daily closing stock indices of four developed markets and four emerging markets is taken from the period of Jan 1, 2005 to Dec 31, 2018. Four South Asian countries Pakistan, Sri Lanka, Nepal and India are selected whereas two stock markets are selected from USA and two stock markets are selected from China as developed countries stock markets. By splitting the co integration of stock markets into four phases: overall (2005-2018), pre-crisis (2005-2008), post crisis-1 (2008-2015) and post crisis -2 (2016-2018) the time series Markov switching analysis is used to analyze the behavior and influence of respective stock markets and bull and bear markets of South Asian stock markets have been analyzed. The results indicated the presence of volatility and significant relationships with respect to USA markets and very little influence of Chinese markets and all the phases.

Key words: Stock market, South Asian Stock Markets, developed markets, Emerging markets, Volatility spillover, Markov Analysis

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List of Acronyms

WFE	World Federation Exchanges
BDVDIS	Bombay Variable Dividend industrial share Index
NYSE	New York Stock Exchange
NASDAQ	National Association of Securities Dealers Automated Quotations.
SZSE	Shenzhen Stock Exchange
SSE	Shanghai Stock Exchange
KSE	Karachi Stock Exchange
CSE	Colombo Stock Exchange
NEPSE	Nepal Stock Exchange
NSE	National Stock Exchange of India
Min.	Minimum
Max.	Maximum
Std. Error	Standard Error
GARCH	Generalized Autoregressive Conditional Heteroscedasticity
ARCH	Autoregressive Conditional Heteroscedasticity
EU	European Union
MA	Moving Average
ASPI	All Share Price Index
NASD	National Association of Securities Dealers.
NIC	Industrializing countries of Asia
FDI	Foreign Direct Investment

Dedication

I dedicate my dissertation to my beloved mother
*"**Mrs. Parveen Bano**" Who has been a source of inspiration throughout my life.*

What I am today is just because of her infinite sacrifices, endless support and patience and love. I might not be the same person without all these.

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"**In the Name of Allah**, the Most Beneficent, the Most Merciful"

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Chapter 1

INTRODUCTION

Globalization and network economy has drastic effect on capital markets and have dramatically changed the functioning and channels of markets. The globalization unfolds the process which explains how the economies have been integrated as it has become so popular term in past years because markets have become interdependent on each other and their integration has increased so much in the last 20 years and had an intense effect on the economy of countries. Thus, market interdependence has increased all over the world due to the globalized economic activities and increase in financial flows from one market to other globally (Xanthakis and Balios, 2003) the integration has increased the interaction between national economies and financial markets through foreign trade. The interaction between markets and their integration and linkages is useful for securities pricing development of strategies and their regulation across markets and within markets (Brailsford 1996, Theodosius et al. ,1997). Globalization has a strong impact in all areas of the economy be it industries, money markets or capital markets. This is because interaction among world has become so common that information spreads so quickly. Globalization and investments across borders results in new information in markets which results in change in currency market and currency, market appreciates and depreciates which further results in fluctuations in the stock market. The interdependence among stock markets is beneficial for increase in investments and economic growth (Mishkin, 2005 pp 14). Globalization is the main factor behind diversification of stock markets of world and investors always try to invest in such markets which have lower risks. Many studies state that interlinkages and integrations among markets have been affected by global crisis of 2008, thus this study investigates whether the developing markets synchronize with developed markets and pre- and post-crisis behavior of markets.

It is thought that interdependence has increased volatility transmission in stock markets (Forbes, 2001; Bekaert et al, 2010). Thus, speedy volatility transmission shocks coincide with interdependence. As in interlinked economy isolation of domestic markets is reduced and due to the transmission of costless information the market very quickly and policy makers, investors react to the shocks and news arising from the world very promptly. (Singh & Kumar, 2008). As a result,

developed or international markets volatility affect the volatility in domestic or emerging markets. This research focuses on volatility spillover effects which transmitting from the developed markets to the markets of South Asian region.

It has been noticed that stock markets during last few decades have been integrated with each other. This integration was started with liberalization and then few countries have dominated other countries economically with passage of time. As a result, there is seen spillover behavior among counters and volatility shocks transmission from one market to another. Thus, economies are integrated globally for trade and investments opportunities and markets are compelled to influence other markets due to some financial factors which result in transmission of shocks in terms of bad or good news which create spillover from one market to other.

1.1 Theoretical Background

1.1.1 Volatility:

Analyzing the financial assets volatility has remained of importance to the investors, policy makers, academicians, and participants of financial markets for various reasons. As volatility can be defined as a parameter to the measure of risk exposure it helps economic agents to analyze the exposure in their investments and pricing of derivative securities and other stocks. The spillover of volatility is defined as the shocks which arise from one market and are transmitted to another markets. The volatility spillover effects can either be positive or negative depending upon what change they bring in other variables and markets. Volatility spillover plays important role in investigating the mechanism that how information is transmitted among financial markets. If there is proper integration among markets, then shocks and information from one market automatically disseminates to other markets. Studies have also shown that shocks have more effect in integrated markets as compared to nonintegrated markets and thus volatility spillover increases in case of financial crisis conditions. International investors and researchers have shown great interest in emerging markets due to well diversification opportunities and can be easily accessed due to transparency, less restrictions on transactions.

There are two well-known features of volatility. Firstly, it responds to good and bad news in asymmetric manner i.e., negative returns in one market result in higher positive returns in other

market or variable. Secondly, symmetric behavior of volatility in which volatility is often moves together across markets and variables over some time. The study of volatility transmission has remained hot topic for researchers and practitioners as it is helpful in portfolio management where spillover effects can be helpful in allocation of assets and estimating the values of different stocks, risk calculation and hedging.

Researchers have documented stock market irregularities over past decades. As Shiller proposed that there is irrational reaction from the people when they receive some information which in turn creates volatility in financial markets. Thus, understanding of volatility is of great importance as it results in uncertainty that can influence the decisions of investors for buying and selling of stocks. When causes of volatility are unknown and there is lack of information about it then will result in inaccurate strategies. Many researchers have linked these irregularities with some macroeconomic factors. (Kutan& Davis, 2003), (Officer, 1973), (Schwert, 1989) while other researcher has associated the irregularities with emotions of humans. (Martin, 2011) states that lethal determinant of volatility is human emotion, he also states that investors behavior is also affected by fear and greed which causes investor to increase or decrease buying and selling of stocks, thus causing short term volatility. This study of Martin was further supported by Indro, Lee and Jiang (2002) and Verma (2007) who concluded that investors sentiments are the main drivers of volatility of returns of S&P 500 in New York Stock Exchange (NYSE). There are numerous research in which behavioral finance explained volatility of stock markets during different market conditions. Law (2006) Wasiuzzaman and Angabini (2010) conducted research and found the existence of high volatility in KLCI during financial crisis of Asia and Global crisis of 2008.

1.1.2 Approaches of Stock Markets Co Movements

Globalization has interlinked markets and economies and thus information from one market flows to other very quickly due to integration. The main purpose of these markets is to serve as a place of exchange of capital. As with change in markets dynamic the flow of investment and behavior of investors also changes, FDI (Foreign Direct Investment is the fastest growing form of international investments and trade between integrated economies. FDI are the most important form of capital flows internationally and thus source of international financing for developing and emerging markets. In the integrated Stock markets investors can do the buying and selling of shares in other markets of

region without any restrictions. Buying of stocks is easy, the real trouble for the investors is in choosing the right stock at the right time for trading. There are different indices from where investors can monitor the stock market's performance and can invest accordingly in the efficient stocks such as S & P 500, Nasdaq Composite, Dow and Jones Industrial Average, etc. Thus, the interlinking and globalization of markets of great importance from investor's prospect and thus an efficient market is an ideal market for them.

There are usually three channels which effect the interlinked an interdependent market such as financial linkages, trade shocks and devaluation shocks. The information flows from one market and is transferred to another due to economic activities and financial linkages. The trade and devaluation shocks arising in one country will automatically affect other countries because of these linkages and integration. There have been lots of work in past on interlinking and interconnections of markets, volatility spillover that how the markets are affected by integration and what are the effects of spillover an thus researchers concurred that if there is volatility in one financial markets it will have a spillover in other financial market and spillover from dominant markets will affect the emerging markets. (Rogers & Kim, 1995). Such as equity markets (Hamao et al., 1990) (Lin et al, 1994) equities, exchange rates (Rezitis and Apergis, 2001), exchange rates (Engle et al., 1990) and for future contracts (Abrhyankar, 1995).

The co movement among financial markets can be described normally with three approaches i.e., the contagion effect, market integration and the characteristics which influence the markets. The contagion effect is a part of stock markets and can be defined as a condition in which shock in specified economy spreads and effects other economies. According to many researchers and analysts, contagions have been called a primary characteristic of markets interdependence. Associating with financial crisis, contagions can be called as negative externalities which transmit from one crashed market to other. Contagion cannot be measured itself however it can be estimated from the movements

Economic integration is the second approach which refers to a condition in which different markets become one i.e., the economies of two or more countries are integrated in a manner that there is increase or decrease in values of goods or stocks in similar patterns. For example, two economies have a relation of bi-lateral trade thus prices of exporting regions and that of importing regions

become equal including all costs incurred in moving stocks among markets then such markets will be called integrated markets. (Martin Ravallion, 1986). Factors which lead to integration of stock markets have been studied by many researchers (Lamba & Janakiramanan, 1998) states that increased linkages in stock markets can be due to dominant economy, multiple stock listings and common investor group in markets.

Third approach for co-movement includes market characteristics which effect the stock market integration to the extent. These characteristics include volatility, industry and market sizes etc. (Pretorius, 2002). When markets are dominated by industry their extent to industrial similarity between two markets will increases the extent pf their integration.

1.1.3 Investor Sentiment and International Stock Markets

The linkages among emerging and international markets have emerged due to internationalization factors and thus integration results in transmission of shocks and effects of volatility to other markets. As in domestic markets sellers and buyers join the market and trade their stocks with each other in the same way international buyers and sellers trade their stocks. However, it is important for international investors that they should diversify their investments as well diversified investment portfolio helps in limiting the chance of risk and inflow of capital helps in creating linkages between markets. As the cross-border investments increased in recent years due to which markets have become more volatile thus increasing the portfolio risk internationally.

Such market risks effect portfolio of investors so it is considered that to understand how markets work the best approach is measuring the interdependence and integration of markets. Due to well diversification opportunities researchers show great interest in emerging markets for international investors. As the emerging markets are more diversified and are easily accessible for investments because of less restrictions and more financial transparency

The researchers and practitioners have focused on studying the integration and co movement among financial markets since the developments of markets. As in the globalized world information moves quickly and stock markets follow each other because of such information efficiency. This availability of channels such as internet, televisions etc. have made possible the information to travel across borders including investors sentiments. (Fetlock, 2007), (Shiller, 2000)

Many studies have been carried out globally on developed markets especially US markets correlation and integration. Those studies discovered that developed markets have effect on emerging markets. Baker et al, (2012) whose study focused on the effect of sentiments of investors in six developed countries i.e. France, United Kingdom, Canada, Germany, and United States of America found and Japan found that investor's sentiments have great impact on stock returns.

The integration and interdependence among markets have made investors to keep record of movements of domestic as well as developed markets carefully and to plan their strategies of investment accordingly. Apart from investors policy makers also keep a close watch of these co movements because the volatility spillover among markets effects the functioning of financial and economic systems as well. (Mishkin 2005) Due to an increase in the diversification of stock markets investors prefer to invest in different securities and assets to avoid or reduce the risk.

When interdependency increases it also increases volatility transmission between markets which leads to increase the risk globally and thus investors have to face this risk which influences their portfolio of investments. Due to an increase in reliance of nations over other nations savings for better yields and also the investors are seeking portfolio diversification for same purpose it is generally assumed that there are several benefits associated with financial integration and market volatility such as market development, effective discovery of prices, higher savings, higher investment and higher economic progress. But with benefits there come disadvantages and these linkages among markets result in various risk exposures such as contagion and disrupted economic activities. As clear from the late 1990s and 2008s Asian Crisis, there was seen an intense decline in stock markets due to credit market developments in the USA. Thus, economists and policy makers came to the conclusion that it is important to monitor the transition patterns and track the progress among financial markets interdependent on each other for making policies and for effectively participating in the market activities.

Investors are likely to be inclined towards false beliefs while making choices of investment because investors who follow their sentiments develop the beliefs which might be incorrect or wrong statistically. This is because investors may get any news from inappropriate channels (Zhang, 2008) and make their decisions based on that news. So, sentiments of investors are basically proneness of investors that how they trade and make decisions based on their moods,

beliefs and emotions instead of technical analysis and statistical facts. The concept of investors sentiments is classified into broad spectrum and has been used by researchers and policy makers and analysts for research purpose (Wurgler & Baker, 2007), (Shleifer, Barberis & Vishny, 1998), (Cliff & Brown, 2004), (Welch & Qiu 2004), (Zhang, 2008) these studies accredited sentiments of investors as proneness to trade and optimism and pessimism of investors. (Bormann, 2013) concluded that investors behavior is associated with moods and emotions of investors. Other researchers stated the sentiments as fear of investors and risk aversion techniques. The sentiments of investors are connected with ups and downs of market conditions and since in interlinked economies investors are more prone to risk and thus prefer well diversified markets for investment opportunities and for risk aversion. Jebran (2014) stated that due to the liberalization and deregulation of system of trade there has been increase in investment opportunities for local as well as foreign investors. In Globally liberalized economy the barrier of trades has been removed and foreign investors can easily take investment decisions and can invest in common stocks by diversifying their portfolio all over the world and can increase their capital but as with opportunities the investments decisions are affected by spillover from developed markets to emerging markets in globalized world. So, Policy makers and investors rely on volatility as parameter to check the vulnerabilities of stock markets and of economy. If investors react at the same time to the new information which floats in highly relative markets, then this will cause bi-directional volatility spillover. However, many researchers stated that information usually floats at different speeds in different markets. (Nikolova & Bhar, 2009). If volatility spreads to different market from one market, then lead markets will get new information more quickly than that of lag market and vice versa.

1.1.4 Overview of Financial Crisis

As due to globalization the markets have become integrated and globally expanded and thus economies also face effects of globally expanded crisis as well, so it would not be wrong to say that globalization along with benefits have snags as well and in case of crisis circumstances the volatility spillover effects are high in markets.

A number of monetary as well as financial crisis has been seen in past decades which had their consequences in regional and international markets of the world such as Black Monday shock of 1987 which was a sudden stock market crash and world witnessed a dramatic decrease in stock prices, Shock known as the lost decade of Japan in 1990 in which Japan faced the deflation of prices and economic stagnation, Black Wednesday occurred in UK in 1992 which refers to collapse of pound sterling to the extent that British government had no option except the withdrawing of pound from European Exchange Rate Mechanism (ERM), Mexican peso crisis of 1994 which is also known as Tequila effect was a devaluation of Mexican currency which effected other currencies and there was seen a decline in other currencies as well, Russian crisis also termed as Russian cold of 1998 was crisis in which depreciation of ruble caused economic instability and thus default of private as well as public debt was witnessed, Asian crisis also known as Asian Flu of 1997 gripped almost the whole Asian region creating the financial contagion. This crisis also affected the US and Japan markets as well. The other currencies devalued as well because investors wanted to withdraw their investments. , Crisis of Brazil known as Brazilian sneeze of 1999 where there was seen a huge surge in inflows. Dotcom crisis also known as Nasdaq rach was witnessed In 2000 in which was due to the excessive speculation in internet based companies. Argentinean crisis in 2001 was economic depression in country which rose due to many undesirable reasons such as pegging, overvaluation of currency and economic rigidity etc. Subprime mortgage crisis also termed as Sovereign Debt crisis arose in 2007 when banker sold too many mortgages for mortgaged backed securities and had its effects nationwide.

Another huge crisis known as global financial crisis or banking crisis started in 2007 was the severe economic crisis which had its shocks all over the world. It is considered the worst crisis since 1930's the great depression. The reason of this crisis was deregulation in financial sector, poor timings of increasing and decreasing of interest rates and securitization.

Since 1800 to 2008,138 countries were identified to be part of crisis and total of 783 banking crisis have been witnessed. In banking sector, the percentage of crisis has increased up to 300% in past decades. There have been conducted a lot of researches on crisis , their types , their effects and it has been identified that such crisis are part of market and according to (Rogoff and Reinhart, 2009) not a single crisis is purely isolated or unique.

The two main crisis that severely affected the South East Asian countries were Asian currency crisis experienced during the period of 1997-1998 and second was subprime crisis 2007-2008. During Asian currency crisis countries like Indonesia, Philippines, South Korea, Thailand and Malaysia observed a sharp decline around 33-74% in their currencies from June 1997 to August 1998. The subprime crisis started in 2007 which added more stress to currency and equity markets of Asian region. However, it was observed that exchange rate had not declined and was more durable in the state of crisis as compared to the crisis of 1997-1998. The currencies had more stability. There was strong impact of crisis on stock markets. During subprime crisis, the decline in Asian currencies was seen to be around 5% and in stock markets the percentage of decline was around 17%.

As crisis leave strong impact on economies there was seen a drop in ecologic growth, markets and investments became unstable. After 2007-2008 financial crisis the dynamics of adequate growth had shifted to east from west and as a result dynamic of market, markets integration and connectivity, interest of policy makers, analysts and regulatory bodies also shifted towards domestic markets, Lee (2013).

According to data taken from WFE (World Federation Exchanges), Te drop of 22% in world's market capitalization was observed i.e. the world's equity market capitalization was nearly $64 trillion which declined sharply to 49 trillion in 2009. The crisis was originated to United States but had spread quickly and other developed and emerging markets and effected the world's economy. Many research have been conducted during and after crisis period and clear evidences of spillover from developed markets to small economies have been found. For example, the spillover from Germany to United Kingdom and United states to small economies or emerging markets. In past years many studies have been found which analyzed the transmission of volatility and interlinkages of markets. Et al in 2001 examined dynamic interdependence of Asian markets and their volatility transmission during financial crisis period. The results indicated the existence of reciprocal spillover of volatility between Korea and Hong Kong and from Korea to Thailand volatility transmission was unidirectional. A study by Bodnar and Bartram gives a broad analysis about the how global markets are impacted by crisis. The study results showed that portfolio return index of market declined however the results showed that there was increase in volatility and rolling portfolio of world's markets and by making comparison of the correlation of returns during

pre- and post-crisis period, research pointed out the increase in correlation among regional markets.

Due to economies being more vulnerable to shocks and crisis, so after the global financial crisis the world has faced and still facing slowdown in economic growth due to decline in trade and investments. So, keeping close watch of shocks and effects of the financial crisis can help policy makers, investors, and analysts to make better decisions. Thus, this study aims to find out the changing dynamics of emerging markets and investigates whether there has been any influence of developed markets over South Asian Markets pre- and post-crisis, change in volatility transmission and whether the influence of developed markets have increased over emerging markets.

1.2 Statement of The Problem

In interlinked economy stock markets are said to be correlated with each other. And sometimes this interdependence, linking may lead to contagion effects across markets. The global financial crisis of 2007-2008 spread was very rapid and it had a very drastic impact on the performance and functioning of markets all over the world and since then the emerging markets have become the focus of attention for investors, analysts and policy makers. As South Asian markets have shown higher growth in past decades, so the markets are said to be influenced by regional and developed international markets in this situation. So, the volatility spillover behavior from developed markets to emerging markets really needs attention and are of serious concerns.

Numerous studies have been carried out to examine the behavior of south Asian markets and instabilities among markets using technique like Granger causality, GARCH models and many other Garch like models have been employed to examine such instabilities and spillovers. Choi and Hammoudeh in 2007 employed univariate Garch and Markov switching model for studying the volatility behavior of GCC market. a trivariate BEKK-GARCH model was employed by Yash & Parabath in 2017 to capture the cross-market effects of Sri Lanka and other two major south Asian Markets and results indicated the presence of spillovers among markets, Wang & lei in 2016 found evidence of financial contagion during both the 1997 Asian financial crisis and the 2008 global financial crisis by using VAR-structural-GARCH model and further found that main driver which causes fluctuations in Asian markets is the USA, with China having little connection with other markets.

Thus, this study aims to investigate the changing dynamics and fluctuations of markets in the global perspective, the spillover from of USA and Chinese markets over emerging markets of South Asia. Also, the behavior and influence of markets before and after financial crisis using two state markov switching model.

1.3 Rationale of The Study

Globalization has led the domestic as well as international markets to integrate with each other and thus cross border investments have also increased as when information automatically travels to other markets when it disseminates in one market. Practitioners, policy makers, analysts and researchers have always associated the behavior of local markets with that of global and regional markets. The contagion of 2007-08 had drastically affected the whole world as the crisis in United States resulted in major shifts in stock markets of the world and stock indices so it would not be wrong to say that all the markets are linked with United states directly or indirectly so that whatever crisis United States faces it will automatically involve the whole world economically as the functioning and performance of other financial markets of world will be impacted. That same happened in the crisis of 2007-8. There has been much research on linkages of markets across borders. This is because the integration among markets and transmission of shocks and information has always remained the topic of interest for researchers, economists, and analysts. But it is seen that fewer research has been made that how behavior of South Asian markets has been impacted by financial crisis and what are the influences of developed markets over emerging markets of South Asia before and after financial crisis and their level of interdependence. So, the rationale of this study is to investigate the transmission of volatility shocks from developed markets to regional markets after financial crisis and extent of the influence of developed markets over emerging markets and to investigate the behavior of market in different times.

1.4 Research Questions

This study addresses the following questions

RQ1: Whether developed Market of USA influences the volatility of stock markets of South Asia?

RQ2: Whether developed Market of China influences the volatility of stock markets of South Asia?

RQ3: What is the impact of Chinese and USA markets on markets of South Asia?

RQ4: Is there any change in volatility spillover pre- and post-financial crisis?

RQ5: How positive and negative behaviors of USA and Chinese markets effect the South Asian Markets?

1.5 Research Objectives

The objectives of the study are:

1. To find out the influence of USA markets over South Asian Markets.
2. To find out the influence of Chinese markets over South Asian Markets
3. To find out if Chinese and USA markets affect Markets of South Asian region.
4. To analyze the volatility of USA, Chinese and South Asian markets pre- and post-financial crisis.
5. To find out if behaviors of USA and Chinese markets effect behaviors of South Asian Markets.

1.6 Significance of Study

The purpose of this dissertation is to study the changing behavior of markets that whether international markets affect regional markets of South Asia and to what extent USA and Chinese market are dominant to South Asian markets and dynamics of linkages among markets. Outcomes of this study will have three major implications. First, the study will help policy makers for making policies and to investors for making the investment decisions that which markets will better serve their interests of investment and of high returns. Secondly, the results will identify the extent to which markets are inter linked to each other and which factors have strong influence of one market to other and how volatile the markets are after financial crisis. Thirdly, the results will contribute to literature by providing an understanding on the market integration in International and South Asian regional markets and furthermore, this study will help researchers to investigate the market dynamics with respect to the Belt and Road Initiative.

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1.7 Plan of The Study

The First part of the study is comprised of introduction which throws light on market volatility, approaches of stock markets co-movements, sentiments of investors and stock markets, South Asian markets and overview of financial crisis. Second chapter provides insights about the past literature of research carried out by researchers. Third chapter is about the methodology of research and data description. Fourth chapter contains the findings of the study, discussions, and results. The fifth and last chapter is about conclusions, limitations, and directions for future research.

Chapter 2

LITERATURE REVIEW

The integration of financial markets has resulted in interdependent markets both in terms of volatility and returns. With the enhanced linkages and new information technologies, information can be easily transmitted from one country to other and from one market to another and that is the phenomenon of spillover in international markets. The spillovers can be return spillover or volatility spillovers and are caused due to market imperfections, instabilities, and transmission of information from one market to another. Thus, Interlinkages and interdependence of international markets have been an area of interest for researchers. There have been a lot of studies conducted on volatility and spillover in different markets effects, interrelations of economies and how these studies have helped corporations, investors, and decision makers in making decisions. The results of most of the studies clearly showed signs of integration among markets and transmission of volatility spillovers from one market to another. Thus, development of stock markets and increasing interconnections among markets has led to more research in this area with more sophisticated techniques.

In 1972 Tamir made an attempt to show behavior of share prices in four countries i.e. United States, Germany, United Kingdom and Japan. The sample for this study was the end month of quotations of equity indices of markets. Data was taken from January 1955 to October 1966. Later sub samples of data were made. From 1955-61 and then from 1961-66. Regression was applied for estimating the co-movement of prices of shares. The results showed that change in share prices of one country had effect on prices of other country's market index as well.

Sharma and Kennedy in 1977 made their contribution in studying the integration of markets of India with markets of US and London by examining the price behavior for which they tested random walk hypothesis by applying spectral densities techniques and runs analysis. The data sample from 1963 to 1973 of monthly indices was taken and it was found that Bombay Variable Dividend industrial share Index (BDVDIS) was similar to 500 Stock Index, S& P's 425 Common Stock Index and London Financial Time-Actuaries. On the basis of applied tests, they concluded that Indian market is influenced by US markets.

Hilliard in 1979 attempted to study the global markets structure during the financial crisis of the world. For this the author took data of daily closing prices of world's 10 stock exchanges. i.e. Stock exchange of Amsterdam, London, Sydney Paris, New York, Toronto, Zurich, Frankfort and Milan. Hilliard took data from 7th July 1973 to 30th April 1974. Using daily conversion rates, he converted all prices to US numeraire. By applying spectral analysis, the conclusion was made that most intra-continental price indices have same direction even during the period of fluctuations too. They also noticed that intercontinental prices do not relate with each other. Losq and Errunza in 1985, Urrutia and Malliaris in 1992 attempted to study the degree of interlinking and interdependency among national stock markets. Many studies found that there is low correlation among market indices. Eun and Shim in 1989 and Arshanapalli and Doukas in 1993 concluded that interdependence of stock markets has increased after 1987 stock market crash.

Kasa in 1992 examined integration of stock markets of USA, Canada, Japan, England and Germany from 1974-1990. The results showed the low level of integration due to the presence of single co integrating vector. Santa Maria & Espitia (1994) in their study came to the conclusion that high level of correlation in daily returns of all markets of Europe exists. Becker et al. in 1990 studied the linkages between markets of Japan and United States. The result showed the existence of effect of spillover from United States to markets of Japan and both markets were found to be integrated with each other. Moreover, Hamao in 1990, Mei & Ammer (1996), Sheih in 1998, Shim in 1989, Becker in 1990 in made an attempt to develop the framework for measuring the financial integration and they found a lag in the transmission of economic shocks internationally.

Janor in 2007 conducted a study on equity market integration of five ASEAN countries with markets of USA and Japan. The results showed that there was integration across some countries at regional level but there was no consistency between the two sub periods i.e. pre crisis and post crisis of South East Asia and of full sample which clearly indicated that crisis have impacted the integration among markets. As compared to US, the results showed that Japan had more influence on the ASEAN countries markets especially after the crisis period.

Choudhary in 1994 explored the relationship between NIEs i.e. newly Asian Industrialized Economies (Japan and United States) . By taking the sample of the data from the period of January, 1986 - December, 1990, The author by applied variance decomposition and impulse response functions and results found the significant interlinking among markets.

Lin et al (1994) carried out their study between markets of New York and Tokyo stock indices to check the correlations among said markets volatility and returns. For decomposing the everyday return into overnight and daytime returns the researchers used daily intra.The data consisted of price indices after opening of markets i.e indices after 30 minutes if opening of New York market and after 15 minutes of opening of Tokyo market. The data for the study was taken for the period from October 1985 to December 1989 and after applying single extraction model and the aggregated stock model, the results of the model were compared Hamao, Ng and Masulis Garch in mean model (1990). The comparison showed that daytime returns of foreign markets have significant impact on overnight returns of the domestic markets. I.e., New York stock returns influence Tokyo stock returns but Tokyo stock returns do not influence New York stock returns. Researchers further found that the interdependence of the market was bidirectional, and the spillovers of the lagged returns were found to be very little from New York daytime to Tokyo daytime and from Tokyo daytime to New York daytime.

Rogers and Kim in 1995 following the liberalization announcements investigated if there is any volatility transmission from USA and Japan to Korea. They in their research applied GARCH technique and inspected the presence of volatility spillover from markets of USA and Japan to Korean markets. They found that after liberalization, the spillover mainly from Japan has increased and they concluded spillover ha smore effect on volatility of returns then of returns themselves.

Pan and Liu in 1997 examined the volatility spillover and mean return effects from Japan and USA on four Asian stock markets i.e., Singapore, Malaysia, Thailand, and Taiwan. They carried out the study by using the GARCH model. The results of this study indicated that there exists instability in the transmission of mean and volatility spillovers internationally. Furthermore, the conclusion based on results was made that there has been increase in the effects of spillovers after the crash of stock markets occurred in October 1987.They also declared that the US market has more influence in transmission of volatility than Japanese market to Asian Markets.

In 1997, Masih and Masih studied the cointegration relationship among all the Newly Industrializing countries of Asia (NIC) including Singapore, Hong Kong, Taiwan and South Korea. They used multivariate co-integration and concluded that the NIC countries show long run co integration relationships with markets of Germany, US and Japan. Furthermore, Masih & Masih

in 1999 found out the similar results as of study conducted in 1997 even after applying vector error correction model as level VAR models too.

Wang & Connolly in 2000 investigated the co movement between Japanese, UK and US markets for a period of 1986-1996. They examined the returns of said markets and the results stated that the US market has had greatest influence on markets of the UK and Japan whereas the UK stock market had more influence or effect over the USA stock market than Japanese Market.

Kamaiah and Amanulla (1995) investigated the efficiency of the stock markets. They measured the integration among different stock exchanges of India by taking data of monthly aggregate share indices of all Indian RBI. Researchers selected five regional Indian stock exchanges, i.e., Calcutta, Bombay, Ahmedabad, Delhi and Madras and collected data during the period 1980-1993 and used two approaches i.e., market integration approach, error correction approach and co-integration. The results indicated that three stock markets i.e., Madras stock exchange, Bombay stock exchange and Calcutta stock exchange were integrated but were not much efficient whereas stock exchange of Ahmedabad and that of Delhi confirmed the existence of market efficiency in the sense that during study period these markets were not integrated.

Choudhary (1997) studied the relationship of the stock market of the United States with six stock markets of Latin America on a long run. The researcher took weekly data from 1st January 1989 to 31st December 1993 and unit root test, Error correction model and Johansen method of cointegration were applied on the data. The cointegration test showed that with or without US index, there is a long run relationship among the six indices of Latin America. The root test provided evidence for stochastic trend in all indices and error correction showed the significant casualty between the indices.

Johansen (1999) tried to investigate the linkages of the USA market and the five stock markets of the Asia Pacific region. The countries taken from Asia Pacific were Hong Kong, Australia, Malaysia, Singapore, and Japan. The researcher employed a co integration test and he also modified the test with the GARCH effect. This modified test was used to test whether stock prices have similar time varying volatility or not. The result indicated the presence of integration and thus Johansen concluded that as per the results stock markets of Asia Pacific region were highly correlated with market of US but through second moment of returns and not the first moment. Angela Ng. (2000) tried to investigate volatility spillovers changing behavior of Pacific

basin arising from US stock markets and Japanese stock markets. For this weekly data of stock indices in US dollars was taken. The stock market indices taken in research were Hang Sang index of Hong Kong, Kuala Lumpur index, Singapore stock exchange index, Stock exchange index of Korea, Taiwan stock market weighted price index, stock index of Tokyo, Thailand index, and S & P's 500 index. The study was conducted using ARCH and GARCH for Japanese and US returns. The findings stated that that US and Japanese shocks altogether have variations less than ten percent of the weekly variations of returns.

Saidi & Hussain (2000) studied the integration of Pakistan Stock market with major stock markets.The researchers took weekly stock prices indices from the year 1988 to 1993. The interdependence of markets by applying Engle & Ganger co integration, the method of error correction and correlation analysis was analyzed. The results indicated no signs of cointegration among major stock markets and Pakistan stock markets. Thus Hussain & Saidi (2000) came up with the conclusion that Pakistani stock market is likely to be less correlated with other markets and is more diversified thus Pakistan stock market is favorable for international investments and for international investors.

Price and Kasch-Haroutounian in (2001) studied the transmission of volatility among the stock exchanges of Central Europe i.e., Slovakia, Hungary, and Czech Republic. By applying bi-variate Bekk model in study the results indicated that market returns of all the studied stock markets are positively correlated with each other. Furthermore, the results of the study indicated that although volatility of Polish stock market is affected and influenced by Hungarian Stock market's volatility but that is not the case with Hungarian stock market as it is not affected by the volatility arising from the Polish stock market.

Ravazzalo and Iaktis in (2002), conducted the study on the Pacific basin countries by examining the financial links at domestic level and as well as globally. The researchers analyzed excess returns co variance on regional (national) markets during the period of 1980-1998. This study showed that economic integration helps in providing channel for the financial interrogation. The results showed that even in the restriction of foreign exchange there is seen a partly increase in financial integration. Ravazzalo and Iaktis in (2002) also concluded that during 1990s the global and regional financial integration has become stronger even before the Asian crisis.

Fang and Miller in (2002) explored the interlinkages of returns of the stock exchange and depreciation of the currency. They used the bivariate model of GARCH and examined the effects of volatility in currency and stock exchange of Korea during the era of 1997 to 2000 over Asian crisis. The study results showed that the currency depreciation has significant affect and influence over the return of stock markets and that influence is positive whereas the currency depreciation has negative influence on the returns of equity markets. Fang and Miller also concluded that stock market volatility reacts to the currency depreciation volatility. In short depreciation in exchange rates has influence over investment decisions of stock markets.

Naeem in 2002 analyzed the integration of stock price indices of South Asian countries with those of advanced developed countries. He in his study applied Johansen cointegration bivariate and multivariate analysis and results indicated that there exists no integration between the United States and United Kingdom equity markets and equity markets of South Asia.

Nath & Verma (2003) studied the integration in equity markets. They tried to study the integration by analyzing the movement transmission among the biggest three stock markets of Asia i.e., Taiwan, Singapore, and India. The data of daily stock indices was taken from the period of 1994 to 2002. By applying the multivariate and bi variate cointegration analysis (Granger 1969, 1988 and Johnsen 1988), the findings of the study showed that there was no long term inter relationship among markets and thus an equilibrium in those markets. The study concluded that there is a casual influence and impact of returns of one stock market on return of other stock market. Apart from this, the researchers based on this study suggested that as the stock markets are interdependent, and investors can take this opportunity for achievement of long run gains by portfolio diversification and investing in these markets.

Worthington et al in (2003) studied the stock price integration of six markets of Asia with three markets of developed countries. The data was taken from January 1988 to February 2000. The developed markets included Singapore, Hong Kong, and Japan whereas the six Asian markets from Malaysia, Taiwan, Korea, Indonesia, Philippine, and Thailand were selected for the study. The researchers applied VAR techniques and multivariate cointegration. The results indicated that the presence of significant causal relationship along with stationery connection among developed and emerging stock markets. Moreover, the results concluded that there was high integration during the pre- and post-crisis periods.

Paresh et al. in (2003) studied linkages and the integration among South Asian Markets. For the study they took four countries from South Asia including Bangladesh, Pakistan, India, and Sri Lanka. By taking data of daily stock indices from 1995 to 2001 and using the approach of temporal Granger causality and a multivariate cointegration framework he found the relationship among stock markets. the results indicated the unidirectional granger causality transmitting from stock prices of Pakistani market to the stock prices in Indian stock market. Because of the small size and capitalization of the market, Bangladesh was found most exogenous among all four said markets.

Narayen et al in (2004) studied the integration among stock exchanges of India, Pakistan, Bangladesh, and Sri Lanka. The researcher took daily data of stock prices from the year 1995 to the year 2001 for all four stock markets and applied the temporal granger approach. The results indicated the signs of the existence of long-term relationship among studied markets and indicted that stock prices of Indian, Sri Lankan and Bangladesh stock exchanges cause granger stock prices in Pakistan. For short run results showed the unidirectional granger causality arising from stock prices of Pakistan stock markets to Sri Lanka stock market and from Sri Lanka to India.

Higgs and Worthington in 2004 studied the price co movements among emerging markets of eleven countries. They analyzed the short and long run prices co-movements among markets of Korea, China, Indonesia, Chile, Mexico, Malaysia, Peru, Taiwan, Russia, Thailand, and Philippine in Asia with developed markets of seven countries which included Australia, Canada, Hong Kong, New Zealand, Japan, Singapore, and United States. The data of prices was taken from the period of 1995 to 2000 and Granger causality test and variance decomposition test was applied on it. The results indicated the among the capital markets of APEC significant short run interlinking and short run interrelations exist. So, based on results, the researchers made the conclusion that there exists no potential benefit for investors.

Choudhry (2004) evaluated spillovers of mean and volatility among the stock exchanges of rivals on political grounds i.e., Greece and Turkey, Israel and Jordan, Pakistan and India and allies (United States). The results found that between the two rivals and their ally United States, there exists short run bidirectional spillovers of mean and volatility.

In 2005, Kim et. Al tried to test if financial markets of East Asia have less integration with each other than with global markets, as compared to European markets. They along with analyzing the integration of markets estimated the risk sharing degree at regional as well as global level. The results of the studied gravity model of "Bilateral financial Assets Holding" indicated that markets of East Asia tend to have more integration with international markets as compared to the markets of region especially if compared with Europe.

In 2005, Wang et. al studied the spillovers of volatility among three stock markets of the South Asian region which included KSE (Karachi Stock Exchange) from Pakistan, BSE (Bombay Stock Exchange) from India and CSE (Colombo Stock Exchange) from Sri Lanka with Japan and US Markets. By applying a bivariate GARCH model they analyzed unexpected return of markets of South Asian and global shock from USA market and regional shock from Japanese market. The results showed the existence of return spillover in all three markets of South Asia. Furthermore, the results indicated the presence of volatility spillover arising from USA to Sri Lanka and India and from Japan to Pakistan the study showed the influence of regional factors on the markets before the Asian financial crisis, but after crisis period the global factors were seen to be more prominent.

Baele in 2005, to analyze the interdependence of equity market, they tried to measure the volatility spillover's time varying nature from European markets to USA markets and from USA market to European market. For this purpose, regime switching model was applied for analyzing time varying integration as this model allows the shock sensitivities to change with time. The weekly data was taken from the year 1980 to the year 2001 and it contained 1130 observations. The results indicated that in the 1980s and 1990s shock spillover intensity had substantially increased for both markets of USA and EU. The study also provided evidence for contagion arising from the USA market to many equity markets of EU during the period when there is high volatility.

Lamba in 2005 studied the relationships among capital markets of South Asia and developed capital markets. The researcher studied the long and short run relationship from the period of July 1997 to December, 2003 and used the framework of multivariate cointegration. The results indicated that equity markets of developed countries i.e. The USA, Japan and UK had influence over Indian equity market whereas no co integration of developed markets was seen with Sri Lankan and Pakistani markets and both markets were independent.

Moosa & Al Deehani in (2006) studied the spillover effects of volatility on the markets of Kuwait, Saudi Arabia, and Bahrain by using the concept of time series modeling and stochastic volatility. Structural time series model was used in this study because it allows to account for the effect of missing variables encompassing stochastic trends. The data was taken from January 2000 to April 2003 for daily stock prices which covered 688 observations. The results indicated that by the volatility of other two markets, volatility of each of the three markets cannot be identified.

The dynamics of integration of international financial markets were studies by Mishra and Daly in 2006. Thirteen industrial countries were selected for research including Germany, Canada, France, Italy, Sweden, Switzerland, UK, USA, New Zealand, Spain, and Netherlands with Australia. The data of foreign assets and liabilities was taken for the period of 1990 to 2003. The researchers attempted to make comparisons of relative performance of Australia with the said group of countries and the results showed that performance of all to be at a similar stage. By taking foreign assets and liabilities growth in international cross holding as dependent variable the study observed that market capitalization and growth of goods trade are key factors which determine movements of international markets whereas capital and taxes do not play a significant role in defining integration among markets.

The volatility spillover of South East Asian countries with USA and Japanese markets was examined by Dibooglu and Chancharoenchai in 2006. The USA market was taken as world market and Japanese market was taken as regional market. By applying GARCH-M MODEL on the data taken from 1996 to 1999 which include the duration of Asian crisis as well, In the study behavior of markets was seen and the results showed that individual markets interact with other markets and the study also supported contagion of Asia crisis which arose from Thailand and its shocks were seen in other markets as well.

A study was conducted by Tripathy in 2006 to examine the relationship of twenty stock markets of developed countries with the market of Morgan Stanley international. The author applied granger casualty and co-integration test on the data which was taken from the period of July 2003 to the period of July 2005. The results of the study identified the presence of bidirectional causality among the developed stock markets. Furthermore, it was concluded that unidirectional

causality to most developed markets from world markets exist. The long run relationship between developed markets and world markets.

The integration and interrelations of stock markets of the EU and Euro area was studied by Cappiello et al. in 2006, the study investigated the co movements of in the equity markets. The results showed the increased integration and interrelationships between Euro area and EU members during the process towards accession of EU and most commonly in Poland, Hungary, and Czech Republic.

The interlinkages and integration between the emerging stock exchanges of China and Hong Kong with the US market was studied by Li in 2007. The multivariate GARCH approach was used to find out the spillover effects. The results showed that there exist no direct linkages between stock markets of China and the US markets but there exists unidirectional spillover of volatility from stock market of Hong Kong to Shenzhen and Shanghai stock markets. The research concluded that this weak integration may help investors in benefiting from the reduced diversification of risks.

Bhar and Nikolova in 2007 verified the level of integration of BRIC countries on domestic as well as international basis. The data of daily returns was taken from January ,1995 to December, 2004 for all the BRIC countries. To find out the spillover effects of mean and volatility and transmission of equity index returns internationally from world as well as regional perspective. After applying two staged GARCH-M approach, the results showed that there is a high level of integration among BRIC countries and the global markets have more influence on the spillovers of mean and volatility as compared to regional markets. The results of volatility spillover were seen more versatile and instead of global influence, regional influence was seen to have more effect on the volatility of Brazil. Volatility of India and Russia was more influenced by Global markets as compared to regional markets. China was the only country which had negative volatility spillover with both global as well as regional markets equity indices and regional influence was more than that of global influence.

The effect of the bond markets of the United States and Europe was examined by Christiansen (2007) by using the GARCH model. By using GARCH approach the spillovers of mean and volatility from both the bond markets of the US and Europe to the individual bond market was examined. The results identified that effects of mean spillover were negligible whereas

effects of volatility spillover were significant. Followed by the local effects the regional effects were seen to be more prominent for EMU countries and own country effects were found to be stronger for non-EMU countries. The effects of European countries were seen to have smaller effects whereas the US had larger effects leaving the overall results inconclusive. Also, the linking between created markets of UK and US with BRIC emerging markets was examined by Kenourgious (2007). The results showed that during emergency period there exists expanded relationships and volatility as compared to normal conditions.

Hoque in 2007, examined the level of integration of the Bangladesh market with Japanese, USA and stock market of India. For analysis, the daily data was taken from 1990 to 2000, he studied long term cointegration. For long term cointegration study JJ test of integration was employed while to test short term cointegration he employed impulse response and vector error correction model. The result indicated that there exists cointegration. The researcher concluded that as integration exists among studied markets, so it is not possible for the international investors to enjoy the benefits of diversification.

Abbas in 2007 studied the causality and cointegration among Thailand stock markets and global stock markets including Hong Kong, Korea Indonesia, Australia, Japan, Malaysia, Singapore, Philippine, USA, UK, and Taiwan. By employing Granger test on the stock returns data, the results indicated that returns of stock markets of Thailand and its three neighboring countries i.e., Singapore, Malaysia and Taiwan are interlinked.

Kocenda and Egert in 2007 examined the interlinking among the markets of western Union and the stock markets of Hungary, Poland, and Czech Republic. The researchers took 5 minutes data of trick intraday from the mid of 2003 to early 2005 and they applied Granger causality test. The results did not show any favorable integration between western union and Central European markets. This study was further analyzed by Babetskii et al in 2007 by using different perspectives. They calculated the rolling b-convergence (for convergence of stock markets returns) and s-convergence (for convergence of stock volatility) for evaluating the interlinking of Western European stock markets and central European stock markets. The results indicated the existence of b-convergence and s-convergence to some extent as well. They also found that shocks transmitting from one market to others are normally absorbed in half week or less than that. Also, in 2011 Kocenda and Egert employed the Ultra high frequency data for the developed stock

markets of France, United Kingdom and Germany and the emerging stock markets of Hungary, Poland, and Czech Republic. The results identified that during trading hours the correlation among developed and emerging markets is weak. Thus, the study suggested that transfusion of shocks in these markets is more materialized in daily or weekly data frequency instead of frequency of tick-by-tick data.

The return and volatility spillover effect among Indian and twelve other developed and emerging stock markets of Asia was studied by Mukherjee and Mishra in 2008. They took data of daily prices for a period from November 1997 to 2008 April and investigated the fort and second moment interconnections among markets. The researchers argued that there exists time varying volatility both intraday and across the day of stock returns. To test this, they employed GARCH model to account for time valiant conditional variances and the results indicated the different degree of the correlation. The return spillover was found to be significantly positive and bidirectional among India and almost all other stock markets while volatility spillover was found to be unidirectional which means that spillover transmission from other Asian markets to Indian market and from Indian market to other Asian markets.

Lee & Kim in 2008 investigated the real & financial integration of countries of East Asia. For the mentioned economies, the degree of financial versus real, degree of regional versus global and level of integration before and after the financial crisis of 1997-98 was compared. The researchers used data of price and quantity measure of integration as size, stock returns, interest rates etc. and the world aggregate of G-7 countries except Japan and Asian aggregate of ten countries i.e., Malaysia, Philippine, Korea, Japan, China, Indonesia, Hong Kong, Thailand, and Singapore were taken. The results indicated that although prices and quantity show increased financial integration post crisis the cross-border relations do not match, and the degree of regional Asian integration is lesser than the degree of global financial integration. Also, the financial integration is seen to be lagged the real integration.

Chan, Weng and Lien in 2008 investigated the relationship OF Hong Kong financial market with US financial market. By employing band spectrum of regression approach, they examined the dynamics of the interaction and interlinkages among the capital markets. The results indicated the existence of feedback relation among markets in pre financial crisis. The feedback

relation is driven by low frequencies long cycles, but one-way causality was seen from capital market of US to Hong Kong after 911 periods.

Arshad et al. in (2008) studied the long run relation of stock exchange of Pakistan i.e. Karachi stock exchange with developed equity markets of the world. By taking the data from the period of 2000-2006 and multivariate integration analysis was employed to fund the results. The findings indicated that there is no such integration exists between of Karachi stock exchange and equity markets of developed countries. However, the KSE was found to have correlation with equity markets of France & Japan only. Furthermore, the results also concluded that markets are seen to have strong integration with each other, and long run relationship also exists among these markets.

Gilmore et al. in 2008 investigated the degree of integration of three equity markets of Poland, Hungary and Czech Republic with equity markets of UK and Germany. The data was taken from the period of 1995 to 2005 and various co integration tests were employed to test the level of integration among these markets. The results indicated the existence of high level of integration between these equity markets.

Integration of Chinese market with biggest financial markets i.e., Hong Kong, USA, MSCI Asia excluding Japan, Japan and MSCI Europe was analyzed by Johansson in 2009. The data for MSCI index was used for world and for measuring financial integration he made use of copulas and employed their models i.e., GARCH, TGARCH and EGARCH to study interdependence. By using conditional and unconditional copulas, the results of the study indicated market of China is becoming highly integrated with world financial markets. The financial crisis which originated in USA in 2008 also seemed to address this increased integration in last decade.

The return and volatility spillover and linkages of assets return was measured and analyzed by Yilmaz and Diebold (2009). By using variance decomposition VAR, they studied bursts of spillover for both crisis and non-crisis period and the data for the study was taken from the period of January 1992 to November 2007. As per the findings of the study the divergent behavior of the volatility spillover and return dynamics was identified. There was not seen any bursts in return spillover however increasing spillover trends was found which was associated to the increasing integration of financial markets in past fifteen years. Volatility spillovers showed bursts which were readily linked with crisis, but these volatility spillovers did not show any trend.

Savva et. al in 2009 investigated the transmission mechanisms of the price and volatility spillover across London, New York, Paris, and Frankfurt stock markets. The correlation among the markets was identified by using multivariate GARCH model for the periods of pre- and post-the introduction of EURO i.e., from December 1990 to August 2004 daily closing prices were taken and first and second moment for interdependencies among various markets was investigated. Before the Euro period US market remained more influencing market if volatility spillovers are concerned but after the euro period France market remained more influential on the three markets. Thus, conclusion was made that volatility responds asymmetrically to new information and news be it good news or bad.

Mukhopadhyay in (2009) conducted the study to address the main issues which arise in international markets because of integration. The data was taken from 1995 to 2008 for regional, country, and sectorial indices thus, EMI (Emerging Market index), ACWI (All Country World Index) and indices of BRIC and G7 economies were taken from the MSCI. ACWI consisted of 46 countries including twenty-three developed countries and twenty-three developing/ emerging countries. The study was carried out with aim to find out the causes of financial integration and its effects. With the use of descriptive statistics and correlation matrix and simple plot of daily data on sectorial indices of the concerned countries, the results of the study identified that the market integration among or across the countries have two levels, first, it is seen more prominent in those markets which have same development stage, and their development stage is comparable. It was also found that the as compared to the developing markets the markets of developed countries are more integrated with each other than those of emerging countries markets. Secondly, developed markets lead this market integration so it would not be wrong to say that during the period of distress and shocks the financial markets in developing countries suffer more than the financial markets of developed economies.

In 2009, Majid et al. conducted the study to investigate and examine the interlinking among Thailand, Malaysia, Singapore, Indonesia, and Philippines. The data for this purpose was taken from 1988 to 2006. The researcher further spilt the data into two sub period i.e., pre crisis period ad post crisis period. The pre-crisis period contained data from 1st January 1988 to 31st December 2006 and post crises period contained data from 1st January 1998 to 31st December 2006. After using generalized methods of co-integration and moments and two step estimation the researcher

came up with the results which showed the co integration pre- and post-crisis. The markets were interdependent on each other specifically during the crisis of 1997. International investors were seen to have limited opportunities to diversify their portfolio because of the presence of high interdependence among ASEAN 5 countries stock markets.

Rua and Nunes (2009) examined co-movement of returns of stock market among markets of Japan, Germany, UK, and US. For the analysis purpose, the data was taken from January 1973 to December 2007 on monthly basis. To incorporate time and frequency domain, wavelet analysis was used. Results of this paper show that the stock returns co-movement strength is dependent upon the frequency. They also demonstrated that diversification was less important because countries were seen to have more co-movement at lower frequency. They also made concluding remarks that strength of co movement is different across borders and across sectors as well.

In 2009 Queenly examined the market reforms ages interlinking and spillovers of volatility. The researcher investigated the extent to which stock markets of India are interlinked and integrated to the stock markets of developed countries i.e., stock markets of USA, stock markets of UK and stock markets of Japan. The researcher also tried to examine the relationships among sock prices of said markets with those of India. To test the short run relationship the Granger causality test was applied, and the results were positive which indicated the presence of granger causality between the stock returns of developed countries stock markets with Indian stock market. The granger tests results showed the presence of granger causality among the returns of Indian stock market and USA, Japan and UK post structural changes and unidirectional relationship is present between the stock return of UK and Indian market pre structural changes. The findings also concluded that before and after structural changes long run relationships were identified among the Indian stock prices and major trade partners of India. Furthermore, the results showed that causality model stated that the before structural changes spillovers of volatility from UK and Japanese markets did not exist. It was also found that before structural changes, UK and Japanese markets were not properly defined, and markets of USA and Japan were well defined post structural changes. So, it was concluded that USA and Japanese marks were creating the spillovers in NYSE.

The study on volatility spillovers from USA stock markets to South Asian stock markets was carried out by Shamiri and Isa in 2009, the researchers used daily data of stock returns and

intraday data of stock returns and studied the volatility spillovers using GARCH (Generalized Autoregressive Heteroscedasticity) and the presentation of bivariate BEKK. The results showed that USA stock markets returns have strong influence and impact over the stock markets of South Asia and their mean returns.

Tanizaki and Hamori (2009) analyzed the spillover effects among stock markets of United Kingdom, United States and Japan by using price level and volatility. The impact of spillovers of volatility among stock markets, markets of foreign exchange and credit default swap (CDS) in US, Japan and Korea was determined. The study found niggling effect spillovers of return and volatility between stock markets and CDS.

Another study was carried out by Drimbetas, Konteos and Sariannidis in 2010. They tried to investigate that whether or not the stock markets of Singapore, India and Hong Kong are integrated with each other and by using equation of mean returns and presentation of BEKK GARCH the found that all the markets under study i.e. Singapore, India and Hong Kong have high degree of integration and these all markets react to the information which commonly floats and drives from the developed stock market of USA.

Another study in 2010 was conducted by Karim and Sok Gee and they examined the volatility spillovers post financial crisis of Asia. The stock markets of USA, Japan and ASEAN 5 were taken in this study and the results found the returns of ASEAN 5 dependent of the past returns. These returns were highly independent on the past data besides this the results also indicated that stock market of USA have had more influence over the stock markets of ASEAN 5 as compared to the Japanese markets in terms of volatilities and returns. It was also found that ASEAN 5 movements of stock prices show some integral linkages as well. Moreover, The Philippian stock market and stock market of Thailand was more vulnerable to the movements arising from stock markets of other countries.

In 2011, the market integration among countries of Balkan and developed countries was studied by Samotas and Kenoirgios. From the developed countries the stock markets of USA and UK and Germany were taken and integration with Balkan countries was examined. The data was taken from the year 2000 to 2006. By employing different tests of co-integration, the results indicated the presence of long run relationships among stock markets of developed countries and Balkan stock markets.

To study the influence of developed stock markets of Russia and USA over the dynamics of volatility and prices of stock markets of states of Baltic was studied by Soultanaeva in 2011. The study was carried out by employing Q-GARCH model (an Extended AR) and the results were positive which showed that any news which floats from NYSE impacts strongly on the market returns of Vilnius and Tallinn than that of Moscow. One interesting conclusion made on the results was that stock market of Riga was found to be totally independent of any kind of shocks and spillovers arising from the other countries.

Beer & Hebein (2011) investigated the dynamic relationship between two group of developed market and emerging market by using EGARCH framework. The developed countries were UK, Japan, USA, Canada, and Asian emerging markets selected for the study were South Korea, Philippines, Hong Kong, India and Singapore. The results showed that positive significant spillover exists which has arisen from currency market to equity markets for USA market, Canadian Market, South Korean market, Indian and Japanese Market. The depreciation in Currency indicated the decay in stock prices in these countries as depreciation leads to higher inflation in future then investor becomes skeptical about company of their future performance.

Joshi (2011) carried out the study on the Asian markets' volatility spillovers. The markets which included in the study were of Japan, India, Hong Kong, Jakarta, Korea, and China. By employing the GARCH model the study came up with the results which showed that among these stock markets there exists bidirectional co movements. The results also indicated that spillovers were high with in the markets than that of across the markets.

The study on spillover effect of subprime crisis of United States of America on the stock returns of ASEAN 5 was conducted by Sidek and Abdul Rehman. The ASEAN 5 included Philippine, Malaysia, Indonesia, Singapore, Thailand. The results indicated that the volatility shocks arising from US stock markets have impact of the markets of ASEAN 5 and the stock returns of ASEAN 5 were decreased because of the volatility spillovers arisen form US stock markets.

Dimpfle & Jung in 2011, investigated the "the linkages of international financial markets through the transmission of return and volatility spillover around globe. They employed structural VAR models for three representative market of globe (Europe, U.S.A, and Japan) and modeled

mean (return) and volatility separately for the period July 1, 2002 to May 31, 2006. Within this framework, they tested the hypothesis using Granger type causality tests and using impulse response functions they tested the short-term dynamics in the said markets. They also used variance decomposition analysis to identify the leadership effects. Instead of simple returns the data of stock index future returns was used and the results indicated that there exists weak return spillover have short life from USA to market of Japan. Furthermore, the volatility spillovers were found to be more lasting and persistent and it was seen that effect of volatility arising from other foreign markets finishes in two to three trading days but there is persistent influence of home markets which live for almost ten days.

The study on international transmission of money market, bond market and equity market and exchange rate market were conducted by Ehrmann et al. in 2011. They studied the transmission among these markets between the USA and Euro area. For short term interest rates, equity returns, exchange rates and bond yields, the data of seven asset prices was taken of daily returns of 20 years from 1989 to 2008. They studied the international spillovers of both within asset class and across the 54 markets as well. As it is thought that with in the asset classes, transmission of shocks exists but the results and evidence showed spillovers of global cross market are significant as well. Thus, the conclusion based on this study was made that around 30% of Euro area market movements were observed by US markets whereas only 6% of variance of US asset prices were observed by Euro area during 1989-2008.

Abou-Zaid (2011) evaluated the volatility spillover in emerging MENA (Egypt, Israel, and Turkey) countries from NSYE (New York Stock Exchange) and LSE (London Stock Exchange). The daily close to close data was taken for the study and by using daily close to close data during the period January 2, 1997 to September 25, 2007, study found that there exists unidirectional spillover of returns which is significant and arising from USA market to the markets of Israel and Egypt but insignificant for Turkey. UK market was found to have no influence on any of the MENA markets. It was also found in the study that effects of spillovers are dominated by their own lag return effects from other markets in case of both Egypt and Israel, but it is reverse in case of Turkey.

Zhou & Zhang in 2012 had investigated the regional spillovers of volatility, direction of volatility spillovers and total volatility spillovers among the stock markets of the world and Chinese markets. The data for the study was taken from February 1996 to December 2009. By using generalized vector autoregressive structure where the forecast-error of variable ordering is invariant of variance decompositions. The volatility spillover of eleven markets of world was examined in the study and the countries like Taiwan, Japan, USA, Hong Kong, UK, China was selected among the Asian and Chinese markets. The results of the study indicated that in the context of volatility spillover, Chinese market was rarely affected by equity markets of world during 1996 to 2009. Furthermore, it was stated that Chinese market is a little affected before 2005 and Chinese stock market had a greater influence after 2005 on the other market because this market is matured in these years. The volatility interrelationship is more prominent in Hong Kong, Taiwan and Chinese markets than Western, Asian and Chinese market. The study tells us that spillover among the Japanese, Indian and Chinese market is different than among the US, UK and Chinese stock market which further states correlations and co-integration among the equity markets of Asia has much increased in past years.

Al Zeaud and Shbiel in 2012 investigated the US and many major European stock markets to examine and find out the spillover effects. The author found the existence of spillover arising from London market to the markets of Paris, New York, Frankfurt. The authors concluded that uni directional volatility spillover exists within the stock markets of Europe and it transmits from Frankfurt to Paris and then from Paris to London. It was also concluded that instead of volatility declines, bad news induced volatilities transmit more strongly.

Grosvenor and Greenidge (2012) examined the international financial integration of stock markets of Caribbean which include the JSE, the TTSE and the BSE. The study was used to investigate the integration through volatility spillover and by determining the extent of volatility spillover arising from NYSE and transmitting to these regional markets. The daily data was taken from the period of 2005 to 2008. The univariate and multivariate GARCH models were used to evaluate the extent of transmission for both return and volatility by taking composite stock market indices. The univariate results indicated the existence of ARCH and GARCH effects in all the series. Also, the presence of bidirectional mean spillover among Caribbean and between NYSE and these regional countries was found. However, degree of integration is lesser in intra-regional.

But volatility spillover is more significant. Significant GARCH effects suggest highest level of volatility spillover intra-regional as well as global.

Meric et all in 2012 examined the linkages between the global stock markets after the crisis of 2008. Using the analysis of principal component and Granger's causality, the study results indicated that US stock market has significant influence over the stock markets of Asia and Europe. The author also gave insights to global investors so that to maximize the diversification of their portfolio, the investors can use high factor loading in different components. The time-varying correlation analysis indicated that since 2008 international diversification benefits have decreased due to the growing correlation among international stock markets.

Lucey and Claus in 2012 examined stock markets integration among 10 countries of world which included Australia, Hong Kong, Japan, India, New Zealand, Taiwan, Malaysia, South Korea, Singapore and Thailand. The data was taken from April to May of 2006. The results indicated the limited degree of integration among stock markets of Asia pacific, but it showed that degree of segmentation varies among all ten economies.

Hatemi in 2012 investigated the UAE and USA markets co integration. For this the symmetric and asymmetric (which separate the causal impact of negative shocks from positive ones) Granger Causality tests were applied by author. As per the findings of the study, the results obtained from the symmetric casualty tests identified that the UAE markets are segmented from USA markets. The results of asymmetric casualty tests showed that both UAE and USA stock markets are integrated with each other. Another finding revealed in this study was that between these markets there is higher degree of integration when the stock markets are falling instead of rising.

Padhi and Lagesh (2012) in order "to examine interdependence across international financial markets, aimed at investigating volatility transmission between emerging markets (5 Asian +India) and U.S market. The daily data of stock price indices was taken from the period of 1st July 1994 to 30th September 2009 and as base they have used bivariate BEKK and DCM-GARCH model for empirical analysis. Study found the presence of volatility spillover, bidirectional shocks spillover and dynamic conditional correlation between India / U. S, India/Malaysia, India/Taiwan, India/Thailand and India/Indonesia. Indonesia is found the main

transmitter within Asian markets. Asian - U.S stock markets are found to be highly dynamic and time varying".

To examine the impact of spillover between stock prices and exchange rates, Kumar in 2013, explored three emerging markets which included India, Brazil and South Africa. The results of the study indicated the presence of bi-directional volatility spillovers among the stock and foreign exchange markets of three countries.

Li and Giles in 2013 tried to examine the linkages among stock markets of six emerging markets of Asia with US, and Japan. The six Asian markets included India, China, Philippine, Malaysia, Thailand, and Indonesia. The data was taken from Jan 1993 to December 2012 having total count of 5217 observations. The Asymmetric GARCH model has been used by the author to model volatility spillover. Along with volatility performance over the long run, short run dynamics have also been investigated. The sample was divided into two sub sample. The whole sample is again divided into sub-samples. The results of the study indicated that as compared to the developed markets, the emerging markets have been seen to be more effected by the past shocks of their own bot in short run as well as in long run. The stock market of US was affected by its own negative shocks to the greatest extent. The stock market of US being the one of the central in the world had unidirectional shocks and spillovers to both Japan and the Asian markets both in long run as well as short run periods. The results also indicated that only significant volatility spillover was found between Japanese market and Asian markets in long run as well as in short run. However, there were no signs of shock spillovers Japan to the Asian markets in long run. Furthermore, based on the past studies and this study the researcher concluded that linkages between Asian and Japanese markets have increased during past five years.

Louzis and Greece (2013) in their study examined "the return and volatility spillovers among the money, stock, foreign exchange and bond markets of the euro area, utilizing the forecast-error variance decomposition framework of a generalized VAR model proposed by Diebold and Yilmaz (2012). Empirical results, based on a data set covering a twelve-year period (2000-2012), suggested a significant amount of total return and volatility spillover effects throughout the sample, indicating that, on average, more than the 50% of the forecast-error variance of the respective VAR model is explained by spillover effects. Moreover, the stock market is identified as the main transmitter of both return and volatility spillovers even during the current

sovereign debt crisis. The study has established the key role of money market in volatility transmission in the euro area during the outbreak of the global financial crisis".

Singhania and Anchalia in (2013) studied that how the global crisis has affected the stock returns volatility. The authors found the positive impact of subprime crisis in Japanese, Indian and Chinese markets on volatility and returns except Hong Kong while the impact of Euro zone debt crisis had negative impact on the volatility of high volatile stock returns of Indian and stock markets of china except Hong Kong and Japanese stock markets.

Jayasree (2013) conducted a study on stocks that were part of the BSE index to find out the correlation among stock prices of volatility and disclosures. To carry out the study the researcher used regression analysis was used to see the impact of various selected variables on the index. The study proved that among all the studied variables disclosures have significant impact on volatility. The regression model had shown that disclosure had highest intercept value. Also, the slop of disclosures was negative which indicated that volatility is reduced with better disclosures.

Bhowmik (2013) conducted a study to know different dimensions and the impact of volatility of the stock market by studying the past literature. Thus, after carefully analyzing the past literature, the researcher came up with the conclusion that political depressions and instability has increased the stock market volatility which resulted in negative volatility spillovers arising from other countries and thus effect growth of the country by effecting growth rate. The relationship of volatility and foreign trade revealed the facts that volatility increases current and capital account deficits and reduces volume of trade.

Gileko and Fedorova (2014) studied the internal and external relationship between Global and BRIC markets by using GARCH in mean model. Transmission of vitality is also measured by stochastic volatility models between the stock markets. But the GARCH models are consider as mare reliable to market transmission. Many studies are used to investigate the relationship by these types of models. In So et al. (1997) used stochastic volatility model to analyses the volatility transmission in seven Asian equity markets. And the result indicated the presence of volatility transmissions in these markets. Wongswn (2006) also used this SV (stochastic volatility model) to investigate the return of US, Korea, Japan, and Thailand.

In 2014, Chen and Valadkhani studied the switching mechanism of spillovers of volatility in USA stock markets and Australian, UK and Canadian stock markets. The purpose of the study was to examine whether the spillovers of volatility have any switching effects from US markets to markets of Australia, UK and Canada. The results indicated that US market have dominating impact over the volatilities of other stock markets taken in the study and US market influences the other markets and have noticeable impact over the output of volatilities of other markets.

Srivastava (2014) tried to know the volatility of the Indian stock market after the recession taking BSE and NSE as proxies of the Indian stock market. The daily data between 2008 and 2013 was taken for this study. The results revealed that close to close volatility for both the indices was highest in the year 2008-09. The volatility decreased after 2008-09. It was also concluded that stock market reacts negatively to the recessions and financial crises thus increasing the volatility of the stock market.

Lim and Sek (2014) investigated on the interrelationship and examined the volatilities of stock exchanges of Malaysia and USA. For this, the data of pre-crisis period and post crisis period were compared, and the results revealed that very slight interactions exist between both stock exchanges variables. Normally the past values determine the stock market volatility of any country. Thus, after comparison of results the researcher found that USA stock market's volatility has greater influence over the Malaysian stock market volatility in before and after crisis period. However, the Malaysian stock market was seen to have little impact on USA market. The research further found out that oil prices and exchange rates also had no impact on the volatilities of stock markets of Malaysia and USA.

Jebran (2014) explored the relationship between the stock markets of Asia with Pakistani stock market. The countries included in the study were China, Indonesia, Sri Lanka, Malaysia, and India. The monthly data of stock prices index from November 2003 to November, 2013 was used in the study. The evidence provides integration of Indonesia and India stock market by applying the Correlation matrix for the purpose of finding linkage among stock market. This study finds all variables stationary at first difference in unit root test application. The Johansen and Juselius approach of Co-integration was used to examine the long run relationship among variables which reveals only one equation of co-integration. Sri Lankan stock market is granger caused by Malaysia, India, and Indonesia stock market by applying Granger Causality test. As per statistical

results, there exists unidirectional causality from Indonesia, India and Malaysia to stock market of Sri Lanka. As per the finding of this study there was no long run interconnections of Pakistani stock markets are seen with any other stock market. The results of variance decomposition states that variances in Pakistani stock market and India is because of their own market innovation and others stock market have no influence on them.

Taşdemir & Yalama (2014) tried to investigate the volatility spillover effects of two major yet emerging markets of BOVESPA and ISE which have financial interaction and insubstantial trade and located in different states. By applying Cross- correlation causality test in variance, this study examined the direction of volatility flow and their existence between these two countries before and after the period of three major crisis. Multivariate approach permits us to control the spillover effect within region and the financial center. There is direct linkage between two equity markets as per evidence. BOVESOA and ISE are affected by the financial crisis in case of the volatility transmission as per finding. In all sub period, the volatility spillover effect exists from Brazil to Turkey but from Turkey to Brazil, the volatility spillover effect is only Post crisis period.

Liow (2015) studied the volatility spillover effects in G7 countries locally and internationally for the years 1997-2013 among five classes of the assets i.e., stocks, bonds, public real estate, currency, and money. In the study it was found that in all domestic market's volatility was predominant. Furthermore, the results also indicated that an interconnection exists between the cycle of spillover, asset market return volatility cycle and fluctuations of co-movements of domestic business cycle.

Hussain et. al. in 2015 investigated the relationship of volatility of stock returns and macroeconomics variables in Pakistani stock market. The researcher used data of monthly observations between 2001 and 2011. To study the relationship the method of Auto Regressive Distributed Lag was used. The results revealed that the main factors which are responsible for explaining the volatility of stock returns are macroeconomics variables. Inflation, real exchange rates and prices of oil are the factors which increase the volatility of stock returns whereas real supply of money and industrial output is related negatively to volatility.

In 2015 Jan and Jebran explained the spillover effects of volatility from the equity markets of G5 countries with KSE (Karachi Stock Exchange). The data was taken from 5th January, 2004 to 30th, January 2013 on weekly basis and Johansen and Juselius co-integration analysis was used

by researchers to find the results. The study aimed to find the long run relation between the G5 stock market and Karachi stock exchange. France, Japan, U.S., Germany, and UK countries are included in G5 countries. GARCH (1, 1) method was used to study that if volatility spillover exists between these two markets or not. The results of co-integration analysis showed the existence of long run relationship among Karachi stock market, UK stock market and Germany stock market. Also, there exists volatility spillover between KSE and G5 stock market. The results revealed that any kind of discrepancies in stock market of G5 will impact Karachi Stock market and will have effect of KSE. It was further found that volatility of KSE is increased by France, UK, Japan and Germany stock market while it is decreased by US market. Based on empirical results, the researchers concluded that there is less diversification opportunities for G5 equity market and KSE investors. Based on results, it is not favorable for investors of KSE to invest in G5 equity market for diversification of their portfolio. Furthermore, the investors of G5 stock market cannot take any favorable benefit by investing in KSE emerging market. Covering only 10 period of years, this study was limited to examine the economic integration of KSE and equity market of G5 countries.

Jebran and Iqbal (2016) carried out their research for examining volatility spillovers among foreign and stock exchange markets of selective Asian countries which included Pakistan, Japan, Sri Lanka, Hong Kong, India, and China. The results revealed that the asymmetric and bidirectional effects of volatility spillover among foreign exchange and stock markets of China, Pakistan, Sri Lanka, and Hong Kong exist. The results further found the unidirectional volatility transmission from Indian stock market to foreign exchange market. But as for Japanese markets there has been found little to no transmission between two markets.

Dedi and Yavas (2016) examined the spillover effects of return and volatility between equity markets and the market of corresponding country i.e., UK, Germany, Russia, Turkey and China. The results found the returns co-movement where Turkey and Russia exhibited the highest volatility while China and UK had the lowest spillovers of volatility. The study further explored that except the UK and Turkish stock exchanges, all other stock exchanges do indicate spillovers of volatility arising from the other markets. The research further explored out that only in case of UK there was a positive impact of volatility on future returns.

In 2016, Basher and Sadorsky found the oil as best hedge in equity markets by comparing it with bonds. For this study they employed dynamic conditional correlation GARCGH model and investigated d the Volatility spillover effects. The results indicated no spillover from commodity market such as oil, gold, gas etc. to equity markets. The results showed that spillover exists among commodity markets i.e., from oil to gas or rice etc. The research further concluded that there is neither volatility nor mean spillover from gold to equity market. This is helpful for diversification of investment portfolios as researchers can invest in both gold and equity markets to diversify risk.

Mensi et al in 2016 carried out the research to study the volatility spillover effect between developed market (USA) and emerging BRIC markets. The data sample taken for the research was from 1997 to 2013. The results indicated the strong asymmetric volatility spillover between developed and emerging markets.

Peng et al. in (2017) investigated the spillover effects of return between Nikkei and TAIEX of Taiwan with aim to find out the long run co integration between their indices. After studying, the cross-market effect found that Nikkei's past returns are influencing the current returns on TAIEX but TAIEX returns are not influencing the Nikkei's returns. The study further found that common price leading effect, cross market volatility spillover effect and inner market leverage effect is also present. By clearly studying the relative asymmetry of both indices the researchers concluded that these two markets were more sensitive to falling patterns instead of rising patterns of one another.

Santamaria, Gonzalez, Guarin & Velandia,in (2017) investigated the spillover effects of volatility among major global stock market index of the world. This study uses DCC-GARCH structure for demonstrating the relationship of multivariate of volatility among the stock market and is the extension of Diebold and Yilmaz (2012) who consider the time- varying framework of their covariance mediums who calculate spillover directly from the return series. Researchers in the study used daily data and same sample period from January 2001 to August 2016. And the countries selected were Germany, UK, Japan, Australia, Canada, China, and US. The study finds several kinds of results. First, spillover results provide the extensive variation overtime and when markets are instable it becomes greater. From the period of 2007 to 2007, total spillover present the increasing trend and it remains higher at the end of 2011 period. The total spillover extent level above 67% during that time, conforming to the financial crises internationally which is higher than

normal average before crisis. However, it reduces from 2011 somehow. This shows that the spillover intensity has risen, even in the non-crisis period. However, during sample period net position does not change for each country. The net transmitter always is US, Germany, UK and Canada while Japan, Canada and China are the net receivers. However, when the total spillover is considered, their intensities reveal significant time-variation. Transmission initiates in developed stock market. But the strength of transmission is lower within this group of markets than others. Even the Chinese equity market is grown overtime, but still a net receiver of spillover. Among this set of countries, to test volatility spillover is higher during subprime crisis pairwise spillover is revealed on constant term and dummy variable is used for the financial crisis period. The results revealed that all constant is statistically significant and positive. The volatility results in all countries are different from US. The evidence provides us that spillover significantly is increase significantly during the crisis period.

Liao &Yu in 2017 examined the spillover effects of mean and volatility effect among China's equity market, money market interest and currency market by using GARCH (1, 1)-BEKK of VAR (7) model. The sample period taken for this study was from July 2005 to December 2016. The analysis revealed that there exists uni-directional spillover from foreign exchange market to stock market only. Secondly, between equity market & money market and the foreign exchange market & money market, there exist bidirectional mean spillover asymmetrically which shows persistence of the volatility and time-varying variance. Thirdly, from equity to money market, the study finds unidirectional variance spillover which is confirmed from money to foreign exchange market.

Kumar & Kamaiah in (2017) studied the Asian stock markets volatility and return spillover by using wavelet cross-correlation and multiple correlations. For this study, daily data is used from stock markets like Hong Kong Shanghai index, Bombay stock exchange, Korea stock index (KOSPI), Tokyo NKKEI 225 stock exchange, Amman stock index and Singapore stock market starts from 3rd January 2000 to 31st December, 2013. The study finds that Asian stock markets in long run are co-integrated. It further finds that significant portion of every market's volatility array can be fundamentally explained by own shocks at intraweek scale but when the degree of spillover increases, the volatility dynamics changes in long run. For wavelet multiple cross-correlation (WMCC) values, it identifies two established markets, HIS and STI, identifies as the follower or

potential leader among group. It finds from the analysis, that volatility spillover among the studied markets is comparatively low at high frequency. This study concludes that in the short run, the opportunities of the diversification for investor exist because the volatility spillover is moderate in short run among markets. However, in long run discrepancies among the markets vanish so it is best for investor to avoid long-term diversification.

In 2018, Abbas and Wang examine the interdependence and contagion across six emerging stock markets of Asia. The stock markets of Asia were China, Bangladesh, India, Malaysia, Philippines, and South Korea. By taking data of daily stock markets, from 2002 to 2016, The researchers divided the data into subsamples i.e., during the pre-crisis, crisis, and post crisis periods and employed GARCH VAR model to see the contagion effect. The results indicated that volatility and return spillover behave differently in different time periods and Asian markets interaction is shown to be less before global crisis and during crisis the volatility spillover indices touch their respective historical peaks

In 2018, Surrender, Prashant & Moon examined the linkages and volatility spillovers of Asia. The model employed to study the linkages was asymmetric multivariate generalized autoregressive conditional heteroscedastic model. Daily data of Stock markets of major five economies of Asia is used for modelling volatility. Data of daily stock prices of selected markets is collected for recent decade and detail autoregressive conditional heteroskedasticity (ARCH) and its generalized models are used to estimate conditional and asymmetric volatilities and results showed that there was a positive significance in case of all emerging market of Asia,

In 2018, Yaxian and Yand examined the nature and dynamics of volatility spillovers between crude oil and agricultural commodity markets since the 2008–09 financial crisis. By employing flexible bivariate heterogeneous autoregressive model, the volatility spillovers were examined, and the results indicated the presence of bidirectional spillover in shit run between the markets of crude oil and agricultural commodity. The results showed that both the markets were indicated after 2008-09 crisis

Chapter 3

RESEARCH DESIGN AND METHODOLOGY

3.1 Overview

The study of behavior of stock markets have been an interested topic for researchers, be it the US market financial crisis occurred in 1987 or the crisis of 1991 or be it the current economic crisis. As a globalized economy has engulfed the whole world, whatever happens in developed markets have its impact in the emerging markets. It would not be wrong to say that the integrated economy spreads things like virus to other regions and emerging markets. In the past two decades the economic integration of stock markets became so relevant and due to the technological development, the flow of investments and capital among countries have increased. Thus, it is important to understand the linkages between financial markets for investment, research and business purposes.

Due to globalization and market integration, information flows from one market to other market so quickly and thus the activities in one stock market influence and effects the activities of other stock markets. Therefore it can be inferred that international stock markets influence the behavior of south Asian stock markets and as a result global markets have an impacts over the markets of South Asian region which result in change in market dynamics, the flow of investment and behavior of investors also changes so current study aims to explore whether US and Chinese markets influence the stock markets of South Asia and in which direction the developed markets effect the South Asian markets , to what extent and to measure volatility spillover before and after financial crisis for sample period of 13 years from 2005 to 2018.

The research methodology for this study comprises of data composition, description of data, sample of data and sampling technique, research technique and equation.

3.2 Data Composition & Description

In this study we have taken NASDAQ and NYSE (New York Stock Exchange) from leading developed stock markets of United States of America and from China we have taken SZE (Shenzhen Stock Exchange) and Shanghai Stock Exchange being the top Stock markets of China respectively. Whereas from South Asian region we have taken six stock markets from six countries of South Asia. These markets include PSX (Pakistan Stock Exchange) from Pakistan, NSE (National Stock Exchange of India) from India, CSE (Colombo Stock Exchange) from Sri Lanka and NEPSE (Nepal Stock Exchange) being the emerging markets.

The data used in this study is secondary data and sources used to collect the data are mainly the stock exchanges official websites, the investing.com, Yahoo Finance, business insider, trading economics, research organizations, published research reports and other related websites. Moreover, the data which is used in this study consists of daily closing indices of the NASDAQ, NYSE, SZE, SZSE, KSE, NSE, CSE, NEPSE from 1st January 2005 to 31st December 2018 i.e. there are 3535 observations from each market.

To achieve the desired results and objectives different measurements and econometric models are employed. Markov switching model is employed to study transitions between states. To capture volatility transmission and spillover effect among markets.

3.3 Stock Markets Overview

In recent years, the interrelations among developed and the Asian markets have increased due to the increasing financial relations, thus this study aims to analyze the influence of developed markets over the south Asian markets. To examine the interlinking and volatility transmission effects emerging markets of South Asia, stock markets of five countries are taken from this region which include: Pakistan, India, Nepal, Sri Lanka, and Bangladesh whereas two developed markets of USA and China are taken.

3.3.1 New York Stock Exchange (NYSE)

New YORK STOCK EXCHANGE is the oldest stock market in the USA and is based in New York. NYSE is one of the biggest platforms which provide facilities of trading financial securities and stocks. It was formed in 1792 after the agreement signed by 24 stockbrokers out of Wall Street. It was initially known as Big Board and is currently owned by Intercontinental Exchange which is an American holding company and is regulated by the Securities and Exchange Commission.

Studies show that the exchange represent the third of equities traded all over the world. Nearly 2800 companies' stocks having market capitalization of US$ 22.9 trillion (2019) are traded in NYSE which include highly grown companies and blue-chip companies. The main indices of NYSE are Dow Jones Industrial Average, S&P 500. MANY giant companies are listed in NYSE including Bank of America, Ford Motor Co, and Twitter Inc. Etc.

3.3.2 NASDAQ

NASDAQ is termed as "National Association of Securities Dealers Automated Quotations". It Is the NEW YORK based stock exchange formed on February 8, 1971. It mainly focuses on technology companies. It is a marketplace were buying and selling of stocks and securities takes place electronically. Th reason behind creation of NASDAQ was to facilitate the dealers so that investors and other parties can trade stocks with ease of fast, transparent, speedy electronic system. It was created by NASD (National Association of Securities Dealers)

NASDAQ is the first electronic market, and its main index is NASDAQ Composite. The term NASDAQ also refers to NASDAQ Composite which includes more than 3300 listing on exchange including stocks of some of the giant companies in the world such as Microsoft, Intel, Apple, Starbucks etc. NASDAQ 100 is also hosted by NASDAQ, which comprises of 107 non-financial companies listing. Today NASDAQ is only behind NYSE and it is the second largest stock exchange in the world having market capitalization of US$10 trillion.

3.3.3 Shanghai Stock Exchange (SSE)

Shanghai Stock Exchange (SSE) had formed on November 10, 1990 and is located in Shanghai, China. SSE is regulated by the China Securities Regulatory Commission (CSRC) being a non-profit organization.

SSE is the China's biggest stock market and is the fourth largest in the world having a market capitalization of US$ 5.01 trillion as of 2019. It includes more than 1000 listings of stocks. Derivatives, stocks, bonds, and funds all are traded on SSE. The main index of SSE are SSE Composite and SSE 50.

3.3.4 **Shenzhen Stock Exchange (SZSE)**

SZSE came into existence on 1st December 1990. It is based in Shenzhen China and works under the supervision of China Securities Regulatory Commission (CSRC) being the self-regulated legal entity. SZSE along with trading of stocks and securities, oversees the functioning of trading of securities, facilitates for trading of securities and performs duties as per law, rules and regulations.

SZSE is the ninth largest stock market in the world with around 1500 listings and market capitalization of US$ 3.51 trillion as of March 2019. The products of SZSE are mutual funds, diversified derivatives, and fixed income products, A-shares, B-shares, indices. Its main indices include SZSE 100 (Blue Chips), SZSE 200, SZSE 300, Composite Index, SZSE component index, SZSE 700 and SZSE 100.

3.3.5 Pakistan Stock Exchange (PSX)

Pakistan stock exchange was founded on January 11, 2016 which is a consolidated marketplace came into existence after merger of Karachi Stock Exchange (KSE), Lahore Stock Exchange (LSE) and Islamabad Stock Exchange (ISE). PSX has its trading floors in Islamabad, Karachi, and Lahore.

Karachi Stock exchange is the oldest marketplace in Pakistan which was formed on 18th September 1947. Lahore Stock Exchange was formed in October 1970 whereas Islamabad Stock

Exchange was founded in July 1992. Now there exists only one consolidated marketplace named as PSX.

According to recent studies the exchanges in PSX include nearly 1886 foreign investors, 883 domestic investors and 0.2 million retail investors. PSX has a market capitalization of US$ 54 Billion as of April 4, 2019 with 545 number of listings. The main indices of PSX are KSE 100, KSE 30 and KMI 30.

3.3.6 National Stock Exchange of India (NSEI)

National Stock Exchange of India (NSEI) is the biggest marketplace in India formed in 1992 and is located in Mumbai, India. NSEI is known for the first electronic screen-based marketplace which facilitates investors across the borders to involve in trading of stocks and securities.

NSEI is the 11th largest stock exchange with a market capitalization of US$ 2.27 trillion as of April 2018 with 1952 numbers of listings of stocks. The common indices of NSE are NIFTY 50, NIFTY 500, and NIFTY NEXT 50.

3.3.7 Colombo Stock Exchange (CSE)

Colombo stock exchange was incorporated after the merging the of share brokers associations and stockbrokers association and was incorporated in 1985. CSE is in Colombo, Sri Lanka with its branches all over the country. It is one of those stock exchanges which provide online trading platform for trading of stocks and securities.

CSE has a market capitalization of US$ 15.6 Billion with listing of nearly 298 companies as per the studies of June 30, 2019. The indices of CSE are ASPI (The All-Share Price Index) and the S&P Sri Lanka 20 Index (S&P SL20).

3.3.4 Nepal Stock Exchange (NEPSE)

Nepal stock exchange was formed in 1993 and is the only stock exchange of Nepal which is located in Kathmandu, Nepal. It started its's first trading on 13 January 1994. NEPSE has a market capitalization of US$ 12.779 Billion with listing of nearly 270 companies as per the studies of October 31st, 2019. The indices of Nepal stock exchange are NEPSE Index.

3.4 Data Sample & Sampling Technique

The closing returns data has been gathered for all the stock markets mentioned above from period of 2005 to 2018. The historic data for the said period has been taken from investing.com, Yahoo Finance, business insider, trading economics, research organizations, published research reports and other related websites which is a definitive source for gathering the data and collection of information, up to date news related to stocks, listings, and provision of technical analysis for financial markets.

As indices are referred as a tool to measure segments of stock markets and are used by policy makers, investors, and managers and stockiest for measuring the financial markets and compare returns for research and investment purposes. Investors follow market indices to track market movements thus main reason behind choosing closing indices of the stock markets as data for our research is to track and capture sharp movements and changes in markets daily. If data has been split into weekly or monthly basis returns of closing indices it would have been difficult to notice these sharp changes and the movements may be averaged out. As according to Yuhn (1997), Marashdeh (2005), Shin and Sohn (2006), Zhao and Elyasiani (2008) monthly data is often less volatile than data with higher frequency.

As the data includes closing indices of emerging markets of South Asia so by this data will be helpful for investors, practitioners, researchers, and business personnel for studying the market movements from developed to emerging markets, their change in dynamics and regimes for research, investment, and comparison purposes because the better tradeoff of returns and risk exposures investments grow quickly in emerging markets. Furthermore, we split the data sample into overall sample (2005-2018) and then into pre financial crisis period (2005-2008), post financial crisis period (2009-2018) and then the post financial crisis data into two further windows (2009-15) and (2016-2018).

Sampling is very helpful in research as it is an important tool which is helpful in determining how accurate research is. Instead of studying the whole population and everyone of population, it allows to infer the information from the results based on subset of population. Thus, high quality information can be obtained in less time and with less effort by reducing the number of individuals of the population.

In large number of data, it is nearly impractical to study the whole population so different techniques of sampling are used to sort out the data and conducting research on specific population. It is equally important that the data sample which has been selected should represent the population. The sampling techniques mostly used are probability or random sampling in which all individuals are taken as sample from the population. Other mostly used technique is systematic or non-probability sampling in which small units of population are collected systematically from population. Systematic sampling is used because it is convenient and spreads the sample more evenly and easier to conduct. Systematic sampling was first studied by Madow (1944). Finney, 1948 and Zinger, 1964 in their study state that systematic sampling is convenient and efficient in large populations.

In this study we will use systematic sampling, the data of closing indices will be split into small units so that sample size drawn will have equal chance of selection. I.e. the sample is obtained by selecting random unit from the beginning will be chosen and thus taking very unit equally spaced after that. Systematic sampling provides implicit stratification and thus can produce better results, (Cochran, 1977)

Following are the indices of the stock markets selected for the study.

TABLE 3.1. **Stock Indices**

STOCK EXCHANGE	**INDEX**
New York Stock Exchange	NYSE Composite Index
NASDAQ Stock Exchange	NASDAQ Composite Index
Shenzhen Stock Exchange	SZSE Composite Index
Shanghai Stock Exchange	SSE Composite Index
Pakistan Stock Exchange	KSE 100 Index
National Stock Exchange of India	Nifty 50
Colombo Stock Exchange	CSE All Share Index
Nepal Stock Exchange	NEPSE Index

3.5 Research Technique

In past years study & analysis of market volatility has remained an important topic for researchers because of the important role in ups and downs of the financial markets and interrelations. There has been conducted a lot of research on market behavior, volatility, spillover effects and market integration using GARCH models. It has been seen that GARCH models do not discriminate between the high volatile phases known as crisis and low volatility phases known as calm periods. GARCH model is symmetrical in both parametrization economies (The economy where other economies are affected in the same way during a crisis or calm periods) as wells as temporal casualties (Where economy affects future volatility of other economies in both periods) Thus GARCH does not explain the crisis which are economic and prevailing financially (Solaa et al., 2002)

Researchers from many decades have been employing linear models in the research for studying the correlation, spillover effects, and volatility among markets. Linear models such as moving average (MA) models, Autoregressive (AR) models, and mixed ARMA models remained the important techniques for studying the level of integration and volatility among markets. These models have been successful in statistics and econometric applications, but they lack to show many nonlinear dynamic patterns such as asymmetries.

Most of the research which had been conducted in the past show that although the GARCH models are good at capturing and showing volatility clustering but sharp movements in the market and spontaneous ups and downs cannot be covered by Garch models however, good projections volatility can be provided by Garch models. (Bollerslev & Andersen, 1998)

The interrelationships among markets can be interpreted easily if the markets have a causal relationship among them i.e., if one market is volatile it will be is induced by the volatility in other markets known as lead lag relationship. (Mishra et al., 2007). The fluctuations and volatility transmission in stock markets has been a continuous trend and to discern those transmission, trends were identified in bull and bear markets by researchers using a statistical model. Many methods and models have been employed to study the interlinking many methods have been used in prior research and one of them is Markov Switching Model which is most common because it formalizes volatility and with this regime switching framework small and sharp changes in markets can also

be captured. We will employ this model in order to classify our data in bull and bear regimes by using daily closing indices of markets.

3.5.1 Markov Switching Model

Markov switching model was developed in 1989 by Hamilton. This model is also called regime switching model as it has gained more popularity during last few decades being the most popular nonlinear time series model because the regime switching processes have become interesting for researchers. Recent studies such as (Ang, 2002a), (Ang, 2002b) considered it advantageous to split the whole data into two or more regime. The time series are often divided into two regimes, one is bull regime which is an upward trending regime where there is low volatility, lower correlation and higher conditional means) and the other one is bear regime a downward trending regime where there is high volatility, high correlation and lower conditional means (Ang , 2002a).

Markov switching model is helpful as the behavior of time series data can be characterized in different regimes. By switching between these regimes dynamic patterns having complex nature can be captured and unobservable state variables which follow Markov Chain control the MSM switching mechanism. Markovian property indicates that state variables current value depends upon its immediate past value. And this structure prevails for some random duration and when switching takes place it will then get replaced by another structure.

Markov switching model is quite different from other models, as the other models allow frequent changes at random points of time, but Markov model allows exogenous and occasional changes thus it is suitable for the data that shows different dynamic pattern in different time period and explains correlated data. The model also focuses on variables mean behavior and thus to analyze the financial and economic time series this model has been widely used by Hamilton in 1988 and 1989, Lam in 1990, Godwin in 1993, Peron in 1995 and Nelson & Kim in 1998 etc. This model has also remained a popular choice in studying the business cycles such as Taiwan business cycle (Lin and Li ,2001), (Hsu and Kuan 2001)

Numerous studies have been conducted which dealt with regime switching volatility spillovers. In 2003, Billio and Pelizzon used switching beta models to study the spillovers. Baele

in 2005 introduced the Markov chain in mean equation and employee linear model heteroskedastic volatility. To analyze the changes in Granger causality, switching VAR model was employed by Psaradakis et al. in 2005.to detect spillovers, multi chain Markov switching model was employed by Gallo and Otranto in 2008. In 2014. Nomikos and Salvador used Markov BEKK model for computation of time carrying correlation. Another study carried out in 2014 by Yang and Hamori who studied the spillover from US monetary policy to the markets of Indonesia, Thailand and Singapore. Ahmed, Houda and Oussama in 2018 analyzed the volatility spillovers across global financial markets by incorporating a fast-tractable Markov regime-switching framework and using a generalized variance decomposition. Wahid and Mumtaz in 2018 analyzed the Spillover effects and the transmission of market dynamics from parental markets to Cross-listed IPOs using Markov switching model.

Due the popularity and regime switching mechanism we have used this technique is our study to check the interdependence among markets and to identify the volatility transmissions from developed markets to emerging South Asian markets.

3.6 Statistical Approach for Analysis of Data

The latest version of Stata software has been used to analyze the data of this study. The descriptive statistics estimates number of observations, mean, standard deviation, minimum maximum values of daily closing returns. To check the regime shifts and transmission of volatilities from developed markets to the developing markets of South Asia time series Markov switching dynamic regression model will be employed

3.7 Econometric Equation

In this technique we consider the highest closing return as bull regime and lowest closing return as bear regime. We apply this technique using the following equation.

$$r_t = \mu_{St} + \epsilon_t, \epsilon_t \sim i.i.d/(0, \sigma_{st}^2) \quad (1)$$

Here, μ_{st} and σ^2_{st} is the mean and variance respectively which are regime dependent. The market is said to be in regime m if st=m. To distinguish between bull and bear regimes, bear regime can be classified as st=0 and bull regime can be classified as st=1 (Rezakhah, Alemohammad & Alizadeh) (2013). Moreover, by using two state Markov switching model the stock returns (r_t) have the following equation for transitional probability and matrix.

$$P(s_t = j | s_{t-1} = i) = P_{ij}(t) \quad (2)$$

Normally, the probabilities are thought to be time invariant so that or all t, but this restriction is not required (Godwin, 2017). Principally, the matrix can be explained as follows: -

$$\mathrm{P} = \begin{bmatrix} p^{00} & p^{01} \\ p^{10} & p^{11} \end{bmatrix} \quad (3)$$

Where, $P^{00} = P(s_t = 0 | s_{t-1} = 0); P^{11}(s_t = 1 | s_{t-1} = 0); P^{01} = 1 - P^{11}; P^{10} = 1 - P^{00}$
Once two regimes are identified statistically, the filtered probabilities are computed for each state. This matrix demonstrates the probability the bull and bear transitions from one regime to another in specific time. $\theta_{jt} = P(s_t = j | \varphi_{t-1}), j = \{0,1\}$. This technique was initially used by Hamilton in (1989) which shows that real GNP growth follows an (autoregressive) AR (4) process (Huang-2014). In this model, nonlinearity arises because the process is based on discrete shifts in the mean, between high-and low-growth states. These discrete shifts comprise of their own dynamics, specified as a two-state first-order Markov process:

$$r_t - \mu_{st} = \emptyset_1(r_{t-1} - \mu_{st-1}) + \emptyset_2(r_{t-2} - \mu_{st-2}) + \emptyset_3(r_{t-3} - \mu_{st-3}) + \emptyset_4(r_{t-4} - \mu_{st-4}) + \sigma\varepsilon_t, \sigma\varepsilon_t \sim \mathrm{N}(0,1)$$

Where rt shows indicates the returns and μ_{st} is the mean which is regime dependent.

Chapter 4

RESULTS & DISCUSSIONS

This chapter comprises of different stages of results. The first part contains descriptive statistics which shows the summary of data overall. The second stage consists of analysis results employed on overall data. The third portion includes the analysis results of data split in four phases which include sample of overall data, pre-crisis period sub sample (2005-2008), post crisis period-1 (2005-2015), post crisis period-2 (2016-2018)

TABLE 4.1. Descriptive Statistics for Stock Indices, 2005-2018

Variable	Mean	Std. Deviation	Min	Max
Developed Markets				
NYSE	0.00020	0.01225	-0.09726	0.12216
NASDAQ	0.00040	0.01282	-0.09142	0.11806
SZSE	0.00042	0.02010	-0.50000	0.08888
SSE	0.00018	0.01827	-0.50000	0.09455
South Asian Markets				
NEPSE	0.00072	0.02299	-0.57143	0.66664
CSE	0.00043	0.00871	-0.07257	0.09717
KSE	0.00058	0.01259	-0.06957	0.08605
NSEI	0.00055	0.01375	-0.14127	0.17744

Table 4.1 presents descriptive statistics of the daily returns of all the developed world markets as well as emerging markets of South Asia. In the descriptive statistics there are two important moments i.e. mean that measures central tendency and standard deviation along with maximum and minimum variables measure variability. The sample period for this study is taken from 2005 to 2018 for the daily closing returns of that four developed and for developing markets of south Asia.

The table 4.1 shows that the mean of all stock markets is positive for stock markets of USA and China as wells as South Asian markets, which indicates that all stock markets have positive average returns. From South Asian markets, maximum average return is of 0.0072 is of NEPSE

which shows the best returns whereas the minimum average returns of 0.00043 is exhibited by CSE. The stock markets NSEI and KSE has almost same average mean return. The minimum standard deviation is exhibited by CSE 0.0087 which shows the less variation and volatility in CSE. The most volatile market is if NESPE with 0.0229. Whereas NSEI and KSE have almost same level of variability. However, in developed markets the SZSE and NASDAQ has high average mean returns, and Chinese markets show more volatility as compared to USA markets.

TABLE 4.2: Markov Switching Analysis CSE, 2005-2018

Markov Switching Analysis (CSE)		
	NYSE	-0.017
		-0.730
	NASDAQ	-0.015
		-0.660
	SZSE	-0.011
	SSE	-0.710
		0.035
		-1.940
State1	_cons	0.000
		-0.8900
State2	_cons	0.0310
		(15.08)**
Lnsigma	_cons	-4.804
		(365.36)**
p11	_cons	-4.245
		(23.23)**
p21	_cons	-1.127
		(2.69)**
N		3,535

p<0.05; ** *p*<0.01

Note: Data which is used in Markov switching analysis is s the data of daily closing returns from the period of 1st January 2008 to 31st December 2018. The results show two states in which state one if greater than state 2 has been categorized as bull regime for respective stock exchange or otherwise bear regime and state 2 if it less than the state 1 it has been categorized as bear regime or otherwise bull state. Similarly, probabilities to sustain in bull and bear markets are indicated as P11 and P21. P>|z| denotes significance at 95 percent ($p < 0.05$).

Table 4.2 represents the overall bull and bear market transition patterns and analysis of closing returns of CSE with regards to the Chinese (SZSE & SSE) and USA (NASDAQ, NYSE) stock markets. It can be deduced from the table that state 1 with coefficient 0 is bear market and

state 2 with coefficient 0.031 is bull market. The portability to sustain in bear market is 23.23% and the transitional probability of switching from bear market to bull market is 76.77% whereas the probability to sustain in bull regime is 2.69% and transitional probability of switching from bull market to bear market is 97.31%. Thus, it can be identified that the CSE market remains in bear regime mostly.

The overall analysis of closing indices returns of CSE with NASDAQ, NYSE, SSE and SZSE shows that not a single market has significant impact over CSE. It can be deduced that the markets NYSE, NASDAQ, SZSE and SSE with coefficients -0.017, -0.015, -0.011, 0.035 respectively have no significant overall impact on the bull and bear markets of CSE.

TABLE 4.3: Markov Switching Analysis KSE, 2005-2018

Markov Switching Analysis (KSE)		
	NYSE	0.0690
		(2.13)*
	NASDAQ	-0.0640
		(2.05)*
	SZSE	0.0010
		(0.02)
	SSE	0.0380
		(1.59)
State1	_cons	-0.0330
		(27.98)**
State2	_cons	0.0020
		(9.86)**
Lnsigma	_cons	-4.5360
		(331.06)**
p11	_cons	0.3010
		(1.56)
p21	_cons	3.6420
		(26.21)**
N		3,535

$p<0.05$; ** $p<0.01$

Note: Data which is used in Markov switching analysis is s the data of daily closing returns from the period of 1st January 2005 to 31st December 2018. The results show two states in which state one if greater than state 2 has been categorized as bull regime for respective stock exchange or otherwise bear regime and state 2 if it less than the state 1 it has been categorized as bear regime or otherwise bull state. Similarly, probabilities to sustain in bull and bear markets are indicated as P11 and P21. P>|z| denotes significance at 95 percent ($p < 0.05$).

From table 4.2, it can be deduced from the table that state 1 with coefficient -0.033 is bear market and state 2 with coefficient 0.002 is bull market. The portability to sustain in bear market is 1.56% and the transitional probability of switching from bear market to bull market is 98.44% whereas the probability to sustain in bull regime is 26.21% and transitional probability of switching from bull market to bear market is 73.79%. Thus, it can be identified that the KSE market mostly remains in bull regime.

The analysis of closing indices returns of KSE stock markets shows that USA market have influence over the KSE market indicating that NASDAQ (Coefficient = -0.064 at $p< 0.05$) and NYSE (Coefficient = 0.069 at $p< 0.05$) have significant impact on the volatility spillovers of KSE. The results indicate that NYSE is penetrating positively and plays positive role in sustaining the bull and bear conditions in KSE while NASDAQ penetrates negatively. The Chinese markets i.e., SZSE and SSE with coefficients 0.001 and 0.038 respectively do not show any influence over KSE thus it can be deduced that KSE is independent of any shocks from SZSE and SSE markets.

TABLE 4.4: MARKOV SWITCHING ANALYSIS NEPSE, 2005-2018

Markov Switching Analysis (NEPSE)		
	NYSE	0.0200
		(0.63)
	NASDAQ	-0.0080
		(0.27)
	SZSE	-0.0050
		(0.26)
	SSE	0.0160
		(0.68)
State1	_cons	-0.0010
		(2.64)**
State2	_cons	0.0460
		(24.20)**
Lnsigma	_cons	-4.520
		(347.99)**
p11	_cons	-3.9150
		(25.83)**
p21	_cons	-2.3450
		(5.06)**
N		3,535

p<0.05; ** *p*<0.01

Note: Data which is used in Markov switching analysis is s the data of daily closing returns from the period of 1st January 2005 to 31st December 2018. The results show two states in which state one if greater than state 2 has been categorized as bull regime for respective stock exchange or otherwise bear regime and state 2 if it less than the state 1 it has been categorized as bear regime or otherwise bull state. Similarly, probabilities to sustain in bull and bear markets are indicated as P11 and P21. P>|z| denotes significance at 95 percent ($p < 0.05$).

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Table 4.4 shows state 1 with coefficient -0.001 is bear market and state 2 with coefficient 0.046 is bull market. The portability to sustain in bear market is 25.83% and the transitional probability of switching from bear market to bull market is 74.14% whereas the probability to sustain in bull regime is 5.06% and transitional probability of switching from bull market to bear market is 94.94%. Thus, it can be identified that the CSE market remains in bear regime mostly.

The overall analysis shows that not a single market has significant impact over NEPSE. It can be deduced that the markets NYSE, NASDAQ, SZSE and SSE with coefficients 0.020, -0.008, -0.005, 0.016 respectively have no significant overall impact on the bull and bear markets conditions of NEPSE.

TABLE 4.5: Pre-Crisis Analysis KSE 2005-2008

KSE	Coef.	Std.Err.	z	P>|z|	[95% Conf.	Interval]
KSE						
NYSE	0.0069829	0.0788617	0.09	0.929	-0.1475832	0.1615489
NASDAQ	-0.0210352	0.0781325	-0.27	0.788	-0.1741721	0.1321018
SZSE	0.0714643	0.0522008	1.37	0.171	-0.0308475	0.1737761
SSE	-0.0710005	0.0558713	-1.27	0.204	-0.1805063	0.0385052
State1						
_cons	-0.0331962	0.0015393	-21.57	0.000	-0.0362132	-0.0301793
State2						
_cons	0.003659	0.0004523	8.09	0.000	0.0027725	0.0045455
sigma	0.0125605	0.000331			0.0119283	0.0132263
p11	0.5846536	0.0561266			0.4722526	0.6888862
p21	0.0453652	0.0084491			0.0314024	0.0651191
N						1019

Note: Data which is used in Markov switching analysis is s the data of daily closing returns from the period of 1st January 2005 to 31st December 2008. The results show two states in which state one if greater than state 2 has been categorized as bull regime for respective stock exchange or otherwise bear regime and state 2 if it less than the state 1 it has been categorized as bear regime or otherwise bull state. Similarly, probabilities to sustain in bull and bear markets are indicated as P11 and P21. P>|z| denotes significance at 95 percent ($p < 0.05$).

The table 4.5 shows the data results of pre-crisis period market transition patterns and analysis of closing returns of KSE with regards to four developed markets. In the table state 1 having coefficient -0.033 represents bear market and state 2 having coefficient 0.003 represents bull market. The portability to sustain in bear market is 58.46% and the transitional probability of switching from bear market to bull market is 41.54% whereas the probability to sustain in bull regime is 4.5% and transitional probability of switching from bull market to bear market is 95.5%. Thus it can be identified that the KSE market mostly remains in bear regime.

The daily closing returns analysis during pre-crisis period analyses the impact on KSE with regard to the USA and Chinese stock markets. It shows that NYSE, NASDAQ, SZSE and SSE with coefficients 0.0069, -0.021, 0.0714, -0.0710 do not have any significant impact on KSE. It can be

deduced from the table that at KSE stock market is not influenced by any Chinese and US stock markets.

TABLE 4.6: Pre-Crisis Analysis CSE, 2005-2008

	Coef.	Std.Err.	z	P>|z|	[95% Conf.	Interval]
CSE						
NYSE	0.1329237	0.0570369	2.33	0.020	0.0211333	0.244714
NASDAQ	-0.112362	0.0570262	-1.97	0.049	-0.2241314	-0.0005926
SZSE	-0.0520613	0.0366019	-1.42	0.155	-0.1237997	0.019677
SSE	0.069799	0.0388235	1.80	0.072	-0.0062936	0.1458916
State1						
_cons	-0.0513843	0.0037695	-13.63	0.000	-0.0587724	-0.0439962
State2						
_cons	0.0005237	0.000298	1.760	0.079	-0.0000603	0.0011078
sigma	0.0094127	0.0002105			0.0090091	0.0098344
p11	0.3206227	0.1563403			0.1036184	0.6583225
p21	0.0062902	0.0026032			0.0027906	0.0141165
N						1019

Note: Data which is used in Markov switching analysis is s the data of daily closing returns from the period of 1st January 2005 to 31st December 2008. The results show two states in which state one if greater than state 2 has been categorized as bull regime for respective stock exchange or otherwise bear regime and state 2 if it less than the state 1 it has been categorized as bear regime or otherwise bull state. Similarly, probabilities to sustain in bull and bear markets are indicated as P11 and P21. P>|z| denotes significance at 95 percent ($p < 0.05$).

The table 4.6 represents the data results of pre-crisis period market transition patterns and analysis of closing returns of CSE which shows that state 1 having coefficient -0.051 represents bear market and state 2 having coefficient 0.0005 represents bull market. The portability to sustain in bear market is 32.06% and the transitional probability of switching from bear market to bull market is 67.94% whereas the probability to sustain in bull regime is 0.6% and transitional probability of switching from bull market to bear market is 99.4%. Thus, it can be identified that the CSE market mostly remains in bear regime.

It can be deduced from the table that CSE stock market is influenced by NYSE and NASDAQ stock markets. The NYSE with (Coefficient = 0.13 at $p < 0.05$) has significant impact and is penetrating positively in CSE market. NASDAQ market with (Coefficient = -0.11 at $p < 0.05$) influences the CSE market but is penetrating negatively. SZSE and SSE with coefficients -0.0052, 0.069 respectively do not have any significant impact on the spillovers of CSE and CSE is independent of any shocks arising from Chinese markets.

TABLE 4.7: Pre-Crisis Analysis NSEI, 2005-2008

NSEI		Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
NSEI							
	NYSE	0.733854	0.0943295	7.78	0.000	0.548972	0.918737
	NASDAQ	-0.409231	0.0928026	-4.41	0.000	-0.591121	-0.227341
	SZSE	-0.148469	0.0624428	-2.38	0.017	-0.270854	-0.026083
	SSE	0.339878	0.0658169	5.16	0.000	0.210879	0.468877
State1							
	_cons	-0.049632	0.0056016	-8.86	0.000	-0.060611	-0.038653
State2							
	_cons	0.001553	0.0005376	2.89	0.004	0.000499	0.002606
	sigma	0.015211	0.0004182			0.014413	0.016053
	p11	0.245466	0.1076582			0.094301	0.504081
	p21	0.016957	0.0068331			0.007665	0.037092
	N						1019

Note: Data which is used in Markov switching analysis is s the data of daily closing returns from the period of 1st January 2005 to 31st December 2008. The results show two states in which state one if greater than state 2 has been categorized as bull regime for respective stock exchange or otherwise bear regime and state 2 if it less than the state 1 it has been categorized as bear regime or otherwise bull state. Similarly, probabilities to sustain in bull and bear markets are indicated as P11 and P21. P>|z| denotes significance at 95 percent ($p < 0.05$).

The table 4.7 shows market transition patterns and analysis of closing returns of NSEI. In the table state 1 having coefficient -0.049 represents bear market and state 2 having coefficient 0.0015 represents bull market. The portability to sustain in bear market is 24.54% and the transitional probability of switching from bear market to bull market is 75.46% whereas the probability to sustain in bull regime is 1.6% and transitional probability of switching from bull market to bear market is 98.4%. Thus, it can be identified that the NSE market mostly remains in bear regime.

The results indicate that NSE stock market is influenced by both Chinese and USA stock markets. The NYSE with (Coefficient = 0.733 at $p < 0.05$) has significant impact and is penetrating positively in NSE market. NASDAQ market with (Coefficient = -0.409 at $p < 0.05$) influences the NSE market but is penetrating negatively. SZSE market (Coefficient = -0.148 at $p < 0.05$)

influences the NSE negatively whereas SSE (Coefficient = 0.33 at $p < 0.05$) have positive influence over bull and bear markets of NSEI.

TABLE 4.8: Post Crisis Analysis KSE, 2009-2015

KSE		Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
KSE							
	NYSE	0.0789833	0.0536276	1.47	0.141	-0.0261248	0.1840915
	NASDAQ	-0.0693714	0.0520303	-1.33	0.182	-0.171349	0.0326062
	SZSE	-0.0172317	0.0270017	-0.64	0.523	-0.0701541	0.0356907
	SSE	0.073923	0.0309664	2.39	0.017	0.01323	0.1346161
State1							
	_cons	-0.0299282	0.0022491	-13.31	0.000	-0.0343363	-0.0255201
State2							
	_cons	0.0017556	0.0002453	7.16	0.000	0.0012748	0.0022364
	sigma	0.0095249	0.0001835			0.0091719	0.0098914
	p11	0.2496375	0.0832798			0.1221823	0.4429573
	p21	0.0174748	0.0043149			0.0107511	0.0282832
	N						1762

Note: Data which is used in Markov switching analysis is s the data of daily closing returns from the period of 1st January 2009 to 31st December 2015. The results show two states in which state one if greater than state 2 has been categorized as bull regime for respective stock exchange or otherwise bear regime and state 2 if it less than the state 1 it has been categorized as bear regime or otherwise bull state. Similarly, probabilities to sustain in bull and bear markets are indicated as P11 and P21. P>|z| denotes significance at 95 percent ($p < 0.05$).

The table 4.8 shows the results of post crisis period one market transition patterns and analysis of closing returns of KSE with the independent stock markets. In the table state 1 having coefficient -0.029 represents bear market and state 2 having coefficient 0.0017 represents bull market. The portability to sustain in bear market is 24.96% and the transitional probability of switching from bear market to bull market is 75.04% whereas the probability to sustain in bull regime is 1.7% and transitional probability of switching from bull market to bear market is 98.3%. Thus, it can be identified that the KSE market mostly remains in bear regime.

The daily closing returns analysis analyses the impact on KSE about the USA and Chinese stock markets. It can be deduced from the table that KSE stock market is only influenced by SSE (Coefficient = 0.07 at $p < 0.05$) and has significant impact on the bull and bear markets of KSE. All other three markets NYSE, NASDAQ, SZSE coefficients 0.078, -0.06, -0.017 respectively do not have any significant impact on KSE.

TABLE 4.9: Post Crisis Analysis CSE, 2009-2015

CSE		Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
CSE							
	NYSE	0.061495	0.043015	1.43	0.153	-0.022812	0.145803
	NASDAQ	-0.088556	0.041806	-2.12	0.034	-0.170494	-0.006617
	SZSE	-0.013866	0.021702	-0.64	0.523	-0.056402	0.028669
	SSE	0.044773	0.024749	1.81	0.07	-0.003734	0.093282
State1							
	_cons	0.000079	0.000216	0.37	0.713	-0.000344	0.000504
State2							
	_cons	0.023498	0.002072	11.34	0.000	0.019437	0.02756
	sigma	0.007639	0.000152			0.007347	0.007944
	p11	0.979369	0.004962			0.967035	0.987149
	p21	0.537586	0.087448			0.368455	0.698488
	N						1762

Note: Data which is used in Markov switching analysis is s the data of daily closing returns from the period of 1st January 2009 to 31st December 2015. The results show two states in which state one if greater than state 2 has been categorized as bull regime for respective stock exchange or otherwise bear regime and state 2 if it less than the state 1 it has been categorized as bear regime or otherwise bull state. Similarly, probabilities to sustain in bull and bear markets are indicated as P11 and P21. P>|z| denotes significance at 95 percent ($p < 0.05$).

In Table 4.9, market transitions analysis of CSE indicates that state 1 with coefficient 0.000 represents bear market and state 2 with coefficient 0.02 represents bull market. The portability to sustain in bear market is 97.93% and the transitional probability of switching from bear market to bull market is 2.07% whereas the probability to sustain in bull regime is 53.7% and transitional probability of switching from bull market to bear market is 46.3%. Thus, it can be identified that the CSE market mostly remains in bear regime.

The table further shows that CSE stock market is only influenced by NASDAQ. The NASDAQ (Coefficient = -0.08 at $p < 0.05$) has significant impact but is penetrating negatively in CSE. NYSE, SZSE and SSE coefficients 0.06, -0.013, 0.044 respectively do not have any significant impact on the spillovers of CSE and CSE is independent of any shocks arising from these markets

TABLE 4.10: Post Crisis Analysis NEPSE, 2016-2018

NEPSE		Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
NEPSE							
	NYSE	0.6365812	0.22263	2.86	0.004	0.2002343	1.0729280
	NASDAQ	-0.4824038	0.1706834	-2.83	0.005	-0.8169371	-0.1478705
	SZSE	-0.0661905	0.141222	-0.47	0.639	-0.3429806	0.2105995
	SSE	0.071326	0.1537108	0.46	0.643	-0.2299417	0.3725936
State 1							
	_cons	-0.0005978	0.0008773	-0.68	0.496	-0.0023173	0.0011218
State 2							
	_cons	0.5353266	0.0169738	31.54	0.000	0.5020585	0.5685946
	sigma	0.0239808	0.0006175			0.0228005	0.0252222
	p11	0.998672	0.0013271			0.9906358	0.999813
	p21	0.5006605	0.353089			0.0592156	0.941078
	N						754

Note: Data which is used in Markov switching analysis is s the data of daily closing returns from the period of 1st January 2016 to 31st December 2018. The results show two states in which state one if greater than state 2 has been categorized as bull regime for respective stock exchange or otherwise bear regime and state 2 if it less than the state 1 it has been categorized as bear regime or otherwise bull state. Similarly, probabilities to sustain in bull and bear markets are indicated as P11 and P21. P>|z| denotes significance at 95 percent ($p < 0.05$).

The table 4.10 shows the data results of during crisis market transition patterns of NEPSE during post crisis period 2. In the table state 1 having coefficient 0.0005 represents bear market and state 2 having coefficient 0.5353 represents bull market. The portability to sustain in bear market is 99.8% and the transitional probability of switching from bear market to bull market is 0.2% whereas the probability to sustain in bull regime is 50% and transitional probability of switching from bull market to bear market is 50%. Thus, it can be identified that the NEPSE post crisis remains in bear regime.

From the daily closing returns analysis, it can be deduced that NEPSE is influenced by NYSE and NASDAQ. The NYSE with (Coefficient = 0.636 at $p < 0.05$) has significant impact and is penetrating positively in NEPSE. NASDAQ market with (Coefficient = -0.48 at $p < 0.05$) influences the NEPSE but is penetrating negatively. SZSE and SSE with coefficients -0.066, 0.07 do not have any significant impact on the NEPSE and is independent of any shocks arising from Chinese markets, respectively.

TABLE 4.11: Post Crisis Analysis CSE, 2016-2018

CSE		Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
CSE							
	NYSE	0.0523703	0.0364894	1.44	0.151	-0.0191476	0.1238881
	NASDAQ	-0.0315425	0.0280254	-1.13	0.260	-0.0864712	0.0233863
	SZSE	0.009842	0.0230621	0.43	0.670	-0.0353589	0.0550429
	SSE	-0.0187658	0.0249169	-0.75	0.451	-0.0676021	0.0300704
State1							
	_cons	-0.0005997	0.0001579	-3.8	0.000	-0.0009091	-0.0002903
State2							
	_cons	0.0107339	0.0013449	7.98	0.000	0.0080979	0.0133699
	sigma	0.003695	0.0001133			0.0034795	0.0039239
	p11	0.9720651	0.0089548			0.9480047	0.985166
	p21	0.7033664	0.1215862			0.4307507	0.8813785
	N						754

Note: Data which is used in Markov switching analysis is s the data of daily closing returns from the period of 1st January 2016 to 31st December 2018. The results show two states in which state one if greater than state 2 has been categorized as bull regime for respective stock exchange or otherwise bear regime and state 2 if it less than the state 1 it has been categorized as bear regime or otherwise bull state. Similarly, probabilities to sustain in bull and bear markets are indicated as P11 and P21. P>|z| denotes significance at 95 percent ($p < 0.05$).

In table 4.11 market transitions of CSE is shown in which state 1 state 1 having coefficient 0.0005 represents bear market and state 2 having coefficient 0.0107 represents bull market. The portability to sustain in bear market is 97.20% and the transitional probability of switching from bear market to bull market is 2.8% whereas the probability to sustain in bull regime is 70.33% and transitional probability of switching from bull market to bear market is 29.67%. Thus, it can be identified that the CSE remains in bear regime.

From the daily closing returns analysis post crisis period 2 analyses the impact on CSE. It can be deduced from the table that no market has significant influence over CSE and NYSE, NASDAQ, SZSE and SSE coefficients 0.05, -0.03.0.009, -0.018 do not have any impact on the bull and bear markets of CSE respectively and CSE is independent of any shocks arising in USA and Chinese markets.

TABLE 4.12: Post Crisis Analysis KSE, 2016-2018

KSE		Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
KSE							
	NYSE	0.1153388	0.0876577	1.32	0.188	-0.0564672	0.2871448
	NASDAQ	-0.0984143	0.0667025	-1.48	0.140	-0.2291488	0.0323203
	SZSE	-0.0607535	0.054688	-1.11	0.267	-0.16794	0.0464331
	SSE	0.0814925	0.059246	1.38	0.169	-0.0346276	0.1976126
State1							
	_cons	-0.0282123	0.0041796	-6.75	0.000	-0.0364042	-0.0200203
State2							
	_cons	0.0009697	0.000374	2.59	0.010	0.0002367	0.0017026
	sigma	0.0088766	0.0002741			0.0083553	0.0094303
	p11	0.1440567	0.1516594			0.014881	0.6521901
	p21	0.0220347	0.0082247			0.0105511	0.045442
	N						754

Note: Data which is used in Markov switching analysis is s the data of daily closing returns from the period of 1st January 2016 to 31st December 2018. The results show two states in which state one if greater than state 2 has been categorized as bull regime for respective stock exchange or otherwise bear regime and state 2 if it less than the state 1 it has been categorized as bear regime or otherwise bull state. Similarly, probabilities to sustain in bull and bear markets are indicated as P11 and P21. P>|z| denotes significance at 95 percent ($p < 0.05$).

In the table 4.12 the transition pattern of KSE is shown in which state 1 having coefficient -0.028 represents bear market and state 2 having coefficient 0.0009 represents bull market. The portability to sustain in bear market is 14.4% and the transitional probability of switching from bear market to bull market is 85.6% whereas the probability to sustain in bull regime is 2.2% and transitional probability of switching from bull market to bear market is 97.8%. Thus, it can be identified that the KSE remains in bear regime.

It is shown in the table that no market has significant influence over CSE and NYSE, NASDAQ, SZSE and SSE coefficients 0.11, -0.09, - 0.06, -0.08 do not have any impact on the bull and bear markets of KSE respectively and KSE is independent of any shocks arising in USA and Chinese markets.

TABLE 4.13: Post Crisis Analysis NSEI -2, 2016-2018

NSEI		Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
NSEI							
	NYSE	0.4633201	0.0655824	7.06	0.000	0.3347809	0.5918592
	NASDAQ	-0.1509231	0.0498785	-3.03	0.002	-0.2486831	-0.053163
	SZSE	0.0539443	0.0405682	1.33	0.184	-0.025568	0.1334566
	SSE	-0.0073635	0.0438484	-0.17	0.867	-0.0933047	0.0785777
State1							
	_cons	-0.0154717	0.0036863	-4.2	0.000	-0.0226966	-0.0082467
State2							
	_cons	0.0008238	0.0002936	2.81	0.005	0.0002483	0.0013992
	sigma	0.0067019	0.0002166			0.0062906	0.0071401
	p11	0.420801	0.2014461			0.1257095	0.7859135
	p21	0.0121866	0.010247			0.0023208	0.0614102
	N						754

Note: Data which is used in Markov switching analysis is s the data of daily closing returns from the period of 1st January 2016 to 31st December 2018. The results show two states in which state one if greater than state 2 has been categorized as bull regime for respective stock exchange or otherwise bear regime and state 2 if it less than the state 1 it has been categorized as bear regime or otherwise bull state. Similarly, probabilities to sustain in bull and bear markets are indicated as P11 and P21. P>|z| denotes significance at 95 percent ($p < 0.05$).

The table 4.13 represents the transitions of NSE post crisis window 2 which shows state 1 having coefficient -0.015 represents bear market and state 2 having coefficient 0.0008 represents bull market. The portability to sustain in bear market is 42.08% and the transitional probability of switching from bear market to bull market is 57.92% whereas the probability to sustain in bull regime is 1.21% and transitional probability of switching from bull market to bear market is 98.79%. Thus, it can be identified that the NSEI mostly remains in bear regime.

From the closing returns analysis, it can be deduced that NSE is influenced by NYSE and NASDAQ. The NYSE with (Coefficient = 0.46 at $p < 0.05$) has significant impact and is penetrating positively in NEPSE. NASDAQ market with (Coefficient = -0.15 at $p < 0.05$) influences the NSEI but is penetrating negatively. SZSE and SSE with coefficients 0.05, -0.007 do not have any significant impact on the NSEI and is independent of any shocks arising from Chinese markets respectively.

DISCUSSIONS & FINDINGS

In the context of the results shown above it is reported that dependent stock markets of South Asia are affected by the shocks arising from developed markets to some extent in different time periods and the influence of USA and Chinese markets is different at different period of time. The data was split in three subsets of pre-crisis period, post crisis and overall analysis. The post crisis period was then split into two windows called post crisis period 1 and post crisis period 2. It is shown in results that NYSE and NASDAQ have significant impact on the KSE overall (2005-2018) and in pre-crisis period, post crisis period 1 and period 2 the results do not show any significant impact of USA markets over KSE and in overall period the NYSE influences positively and NASDAQ is reported to have negative impact on the spillovers of KSE. However, the results show that from Chinese markets only SSE is seen to impact the KSE during post crisis period 1. This can be due the time period factor or factor that how reactive the market is to the shock and anomalies arising from other markets. For CSE the results indicate that developed markets have no influence over CSE overall and in post crisis period 1 data set. However, it can be seen that during pre-crisis period there is significant impact of US stock markets in which NYSE reports positive impact while NASDAQ reports negative. During window one of post crisis period, it is shown in results that only NASDAQ reports significant influence over CSE, and that influence is negatively penetrated. The results for NEPSE indicate that there is no overall impact of any developed USA and Chinese markets over NEPSE and in window two of post crisis period indicated that NYSE and NASDAQ have significant influence over NEPSE in which NYSE is shown to penetrate positively while NASDAQ is penetrating negatively. The NSE is influenced by both USA and Chinese markets. from USA markets NYSE penetrates positively while NASDAQ is seen to penetrate negatively and from Chinese markets SZSE and SSE both markets have significant impact on NSE in which SZSE shows positive impact and is penetrating positively while SSE is penetrating negatively over NSE. In post crisis period 2 only NYSE and NASDAQ influences NSE. NYSE influence positively while NASDAQ penetrates negatively. It is seen that from all south Asian markets, the results have reported that in pre-crisis period only NSEI was influenced by all independent developed markets and all other dependent markets influence changes from time to time.

It is seen that influence of developed market changed from time to time and that can be time period factor the results showed that markets behave differently in different time periods. Abbas and wang in 2018 examined the emerging markets of Asia to analyze the interdependence and volatility spillovers by dividing the data into pre, during and post crisis period and employing the GARCH model they concluded that volatility and return spillover behave differently in different time periods and Asian markets interaction is shown to be less before global crisis and during crisis the volatility spillover indices touch their respective historical peaks. Wahid and Mumtaz in 2018 examined the co movement of KSE that whether regional connectivity causes any return or volatility spillovers post CPEC, by employing GARCH and granger causality tests they found that the co movements and spillovers in PSX are caused by regional connectivity and volatility spillovers. As both USA and Chinese economies are considered strong thus the influence may change depending upon the level of business ties, investment options, trade relations and level of interaction among the markets. Any positive spillover will affect the regional markets in positive ways and any negative shocks will result in abnormalities among markets.

Moreover, as the results indicate that USA markets have more influence and Chines markets seem to have less influence thus impact the behavior of south Asian markets. and if developed markets penetrate positively the south Asian markets on which developed markets have influence will also move in the same direction. So, it can be deduced that USA and Chinese markets behavior of South Asian markets to some extent.

Chapter 5

CONCLUSION, RECOMMENDATIONS & LIMITATIONS

5.1 Conclusion

In the globalized world the interdependence and interlinked economies have serious implications for investors, economists, policy makers and researchers. But as due to integration among economies the contagion and shocks transmission becomes common which delineate the effects of contagion. The financial crisis which originated from United States had affected the economies of the world and had drastic effect on the whole world including developed and developing stock markets which resulted in shifts in stock returns of the stock markets of the world impacting their performance. This study aimed to investigate the changing dynamics of the markets of South Asian regions with respect the developed Chinese markets and developed US markets using Markov switching approach of time series analysis which is helpful and used for study of data behavior in different regimes. The four developed stock markets were taken in the study from USA and China including NYSE NASDAQ, SZSE and SSE. Four developing and emerging markets South Asian region including KSE, CSE, NEPSE and NSE are used to see the influence of developed markets over south Asia. The Markov switching approach is used on the daily closing indices returns of all the stock markets included in the study from 2005 to 2018 and the volatility spillovers and impact of developed markets over the bullish and bearish markets of emerging economies and to verify if there is any influence and of USA and chines markets over the South Asian stock markets and to see the change in influence of markets and their behavior before and after the financial crisis.

The interlinked and interdependent emerging stock markets have many implications for investors, economists, and policy makers as well. Investors who always seek ways for international diversification have shifted their interests to developing markets because of increased integration and interdependence the scope of possibilities of diversification is reduced in these markets. However, in the hope of getting the benefits from shared economies and efficiencies of integrated world the policy makers, economists who had left no stone unturned to open their economies. According to the results it is reported that South Asian stock markets have been seen to be affected

by indifferent influence and volatility arising from the developed markets. The Markov switching analysis indicates that mostly the markets remain in bear regime and it is seen that South Asian markets are more effected by US markets spillovers and there is very low significant impact from Chinese markets over the markets of South Asia. It can be concluded from findings that there is interdependence and contagion from developed markets even small in magnitude but exists. The US markets are seen to penetrate positively and negatively in bullish and bearish markets of South Asia. It can also be deduced from the results that developing markets have more influence of USA markets during the crisis period and only KSE is seen to be impacted by US shocks in overall. It can also be verified that markets are more prone to US shocks and influence and Chinese markets have very little to no influence over south Asian markets. However only during crisis the KSE is seen be influenced by Chinese market at some point during post crisis. This behavior of markets can be due to time factor or economic factor. This may be due to the fact that US is the largest economy in terms of trade and commerce and hence account for maximum propagation of volatility to other stock markets. It is shown in results that only Indian stock market is influenced by China and US markets altogether before crisis period and during crisis. The significant spillovers suggest that markets are moving in same direction which means that if there is shock in one market it will result in increase in the volatility of stocks of dependent markets and negative spillovers suggest that markets are moving in negative direction which indicates that shocks arising in one market causes decrease in volatility in dependent markets. The past literature also supports that at some points markets seem to be more integrated and at some point, integration is less among markets. For instance, study by (Abbas and Wang, 2018) identified that markets behave differently at different periods that can be due to economic influences or time factor. Another Study found the bidirectional volatility between India & Sri Lanka in both sub periods period whereas Hong Kong in pre-crisis period and Sri Lanka and Pakistan in post crisis period. (Jebran & Irfan, 2018)

5.2. Policy Implications

Investors should be vigilant in the perspective of volatility and they always try to explore the opportunities for diversification. As if one or more markets are integrated, then diversification of investments by investors becomes worthless, so to get the good returns with minimized risks the investors always look for the markets with least integration. Thus, the results in study can be helpful for the investors for long run international diversification and can frequently oversee the

co movements, correlations, and volatility spillovers among markets. The policy makers can use this study for achieving enhanced mutual correlation among countries. They can make policies which can be helpful to achieve the political influence, can develop the coordinated response to risks and can make policies to enhance linkages amongst economies of emerging as well as developed economies. Managers can use this information so that they can manage the investments portfolios to avoid the risks and further analyze and plan the strategies to diversify the portfolio and find suitable markets for investment.

5.3. Directions for Future Research

The future research can be carried to investigate the behavior of different stock markets of world that how these markets behave in contagion and what are the factors which determine and keep the markets stable or results in change in movements. In this study only four developed and four emerging markets are taken which can be extended in future research to have better understanding of South Asian stock market behavior, to investigate how spillovers impact the overall functioning of markets and for decision making and portfolio management. This study has been carried out using data of closing indices of emerging stock markets of South Asian region with focus on spillovers and by employing by Markov switching model, the research can be further extended by using many more markets of different countries irrespective of the region with different asset clause and by employing more advanced statistical models and techniques.

5.4. Limitation of study

In this study only four emerging markets are selected from South Asian Region i.e., Stock markets of Pakistan, Sri Lanka, India, and Nepal. Bangladesh could not be included in the study as data of closing indices could not be found for the said time period and for some time periods it was not much volatile and did not have any variations which might have affected the results. Also, the data of daily closing indices have been used in the study and is taken from period of 2005 to 2018 and thus other financial crisis have been ignored in this study and only crisis of 2007-08 have been analyzed.

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Appendix

TABLE 4.1: Descriptive Statistics for stock indices, 2005-2018

Variable	Obs	Mean	Std. Deviation	Min	Max
NYSE	3535	0.0002055	0.0122599	-0.0972599	0.1221624
NASDAQ	3535	0.0004008	0.0128208	-0.0914242	0.1180593
SZSE	3535	0.0004198	0.020106	-0.5	0.0888842
SSE	3535	0.0001825	0.0182759	-0.5	0.0945514
NEPSE	3535	0.0007224	0.0229954	-0.57143	0.6666429
CSE	3535	0.0004309	0.0087148	-0.0725701	0.0971666
KSE	3535	0.0005845	0.0125924	-0.069576	0.0860496
NSEI	3535	0.0005576	0.0137534	-0.1412722	0.1774407

TABLE 4.2: Markov Switching Analysis CSE, 2005-2018

Markov Switching Analysis (CSE)		
	NYSE	-0.017
		-0.730
	NASDAQ	-0.015
		-0.660
	SZSE	-0.011
	SSE	-0.710
		0.035
		-1.940
State1	_cons	0.000
		-0.8900
State2	_cons	0.0310
		(15.08)**
Lnsigma	_cons	-4.804
		(365.36)**
p11	_cons	-4.245
		(23.23)**
p21	_cons	-1.127
		(2.69)**
N		3,535

TABLE 4.3: Markov Switching Analysis KSE, 2005-2018

Markov Switching Analysis (KSE)		
	NYSE	0.0690
		(2.13)*
	NASDAQ	-0.0640
		(2.05)*
	SZSE	0.0010
		(0.02)
	SSE	0.0380
		(1.59)
State1	_cons	-0.0330
		(27.98)**
State2	_cons	0.0020
		(9.86)**
Lnsigma	_cons	-4.5360
		(331.06)**
p11	_cons	0.3010
		(1.56)
p21	_cons	3.6420
		(26.21)**
N		3,535

TABLE 4.4: MARKOV SWITCHING ANALYSIS NEPSE, 2005-2018

Markov Switching Analysis (NEPSE)		
	NYSE	0.0200
		(0.63)
	NASDAQ	-0.0080
		(0.27)
	SZSE	-0.0050
		(0.26)
	SSE	0.0160
		(0.68)
State1	_cons	-0.0010
		(2.64)**
State2	_cons	0.0460
		(24.20)**
Lnsigma	_cons	-4.520
		(347.99)**
p11	_cons	-3.9150
		(25.83)**
p21	_cons	-2.3450
		(5.06)**
N		3,535

TABLE 4.5: Pre-Crisis Analysis KSE 2005-2008

KSE	Coef.	Std.Err.	z	P>|z|	[95% Conf.	Interval]
KSE						
NYSE	0.0069829	0.0788617	0.09	0.929	-0.1475832	0.1615489
NASDAQ	-0.0210352	0.0781325	-0.27	0.788	-0.1741721	0.1321018
SZSE	0.0714643	0.0522008	1.37	0.171	-0.0308475	0.1737761
SSE	-0.0710005	0.0558713	-1.27	0.204	-0.1805063	0.0385052
State1						
_cons	-0.0331962	0.0015393	-21.57	0.000	-0.0362132	-0.0301793
State2						
_cons	0.003659	0.0004523	8.09	0.000	0.0027725	0.0045455
sigma	0.0125605	0.000331			0.0119283	0.0132263
p11	0.5846536	0.0561266			0.4722526	0.6888862
p21	0.0453652	0.0084491			0.0314024	0.0651191
N						1019

TABLE 4.6: Pre-Crisis Analysis CSE, 2005-2008

	Coef.	Std.Err.	z	P>|z|	[95% Conf.	Interval]
CSE						
NYSE	0.1329237	0.0570369	2.33	0.020	0.0211333	0.244714
NASDAQ	-0.112362	0.0570262	-1.97	0.049	-0.2241314	-0.0005926
SZSE	-0.0520613	0.0366019	-1.42	0.155	-0.1237997	0.019677
SSE	0.069799	0.0388235	1.80	0.072	-0.0062936	0.1458916
State1						
_cons	-0.0513843	0.0037695	-13.63	0.000	-0.0587724	-0.0439962
State2						
_cons	0.0005237	0.000298	1.760	0.079	-0.0000603	0.0011078
sigma	0.0094127	0.0002105			0.0090091	0.0098344
p11	0.3206227	0.1563403			0.1036184	0.6583225
p21	0.0062902	0.0026032			0.0027906	0.0141165
N						1019

TABLE 4.7: Pre-Crisis Analysis NSEI, 2005-2008

NSEI		Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
NSEI							
	NYSE	0.733854	0.0943295	7.78	0.000	0.548972	0.918737
	NASDAQ	-0.409231	0.0928026	-4.41	0.000	-0.591121	-0.227341
	SZSE	-0.148469	0.0624428	-2.38	0.017	-0.270854	-0.026083
	SSE	0.339878	0.0658169	5.16	0.000	0.210879	0.468877
State1							
	_cons	-0.049632	0.0056016	-8.86	0.000	-0.060611	-0.038653
State2							
	_cons	0.001553	0.0005376	2.89	0.004	0.000499	0.002606
	sigma	0.015211	0.0004182			0.014413	0.016053
	p11	0.245466	0.1076582			0.094301	0.504081
	p21	0.016957	0.0068331			0.007665	0.037092
	N						1019

TABLE 4.8: Post Crisis Analysis KSE, 2009-2015

KSE		Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
KSE							
	NYSE	0.0789833	0.0536276	1.47	0.141	-0.0261248	0.1840915
	NASDAQ	-0.0693714	0.0520303	-1.33	0.182	-0.171349	0.0326062
	SZSE	-0.0172317	0.0270017	-0.64	0.523	-0.0701541	0.0356907
	SSE	0.073923	0.0309664	2.39	0.017	0.01323	0.1346161
State1							
	_cons	-0.0299282	0.0022491	-13.31	0.000	-0.0343363	-0.0255201
State2							
	_cons	0.0017556	0.0002453	7.16	0.000	0.0012748	0.0022364
	sigma	0.0095249	0.0001835			0.0091719	0.0098914
	p11	0.2496375	0.0832798			0.1221823	0.4429573
	p21	0.0174748	0.0043149			0.0107511	0.0282832
	N						1762

TABLE 4.9: Post Crisis Analysis CSE, 2009-2015

CSE		Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
CSE							
	NYSE	0.061495	0.043015	1.43	0.153	-0.022812	0.145803
	NASDAQ	-0.088556	0.041806	-2.12	0.034	-0.170494	-0.006617
	SZSE	-0.013866	0.021702	-0.64	0.523	-0.056402	0.028669
	SSE	0.044773	0.024749	1.81	0.070	-0.003734	0.093282
State1							
	_cons	0.000079	0.000216	0.37	0.713	-0.000344	0.000504
State2							
	_cons	0.023498	0.002072	11.34	0.000	0.019437	0.02756
	sigma	0.007639	0.000152			0.007347	0.007944
	p11	0.979369	0.004962			0.967035	0.987149
	p21	0.537586	0.087448			0.368455	0.698488
	N						1762

TABLE 4.10: Post Crisis Analysis NEPSE, 2016-2018

NEPSE		Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
NEPSE							
	NYSE	0.6365812	0.22263	2.86	0.004	0.2002343	1.0729280
	NASDAQ	-0.4824038	0.1706834	-2.83	0.005	-0.8169371	-0.1478705
	SZSE	-0.0661905	0.141222	-0.47	0.639	-0.3429806	0.2105995
	SSE	0.071326	0.1537108	0.46	0.643	-0.2299417	0.3725936
State 1							
	_cons	-0.0005978	0.0008773	-0.68	0.496	-0.0023173	0.0011218
State 2							
	_cons	0.5353266	0.0169738	31.54	0.000	0.5020585	0.5685946
	sigma	0.0239808	0.0006175			0.0228005	0.0252222
	p11	0.998672	0.0013271			0.9906358	0.999813
	p21	0.5006605	0.353089			0.0592156	0.941078
	N						754

TABLE 4.11: Post Crisis Analysis CSE, 2016-2018

CSE		Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
CSE							
	NYSE	0.0523703	0.0364894	1.44	0.151	-0.0191476	0.1238881
	NASDAQ	-0.0315425	0.0280254	-1.13	0.260	-0.0864712	0.0233863
	SZSE	0.009842	0.0230621	0.43	0.670	-0.0353589	0.0550429
	SSE	-0.0187658	0.0249169	-0.75	0.451	-0.0676021	0.0300704
State1							
	_cons	-0.0005997	0.0001579	-3.8	0.000	-0.0009091	-0.0002903
State2							
	_cons	0.0107339	0.0013449	7.98	0.000	0.0080979	0.0133699
	sigma	0.003695	0.0001133			0.0034795	0.0039239
	p11	0.9720651	0.0089548			0.9480047	0.985166
	p21	0.7033664	0.1215862			0.4307507	0.8813785
	N						754

TABLE 4.12: Post Crisis Analysis KSE, 2016-2018

KSE		Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
KSE							
	NYSE	0.1153388	0.0876577	1.32	0.188	-0.0564672	0.2871448
	NASDAQ	-0.0984143	0.0667025	-1.48	0.14	-0.2291488	0.0323203
	SZSE	-0.0607535	0.054688	-1.11	0.267	-0.16794	0.0464331
	SSE	0.0814925	0.059246	1.38	0.169	-0.0346276	0.1976126
State1							
	_cons	-0.0282123	0.0041796	-6.75	0.00	-0.0364042	-0.0200203
State2							
	_cons	0.0009697	0.000374	2.59	0.01	0.0002367	0.0017026
	sigma	0.0088766	0.0002741			0.0083553	0.0094303
	p11	0.1440567	0.1516594			0.014881	0.6521901
	p21	0.0220347	0.0082247			0.0105511	0.045442
	N						754

TABLE 4.13: Post Crisis Analysis NSEI -2, 2016-2018

NSEI		Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
NSEI							
	NYSE	0.4633201	0.0655824	7.06	0	0.3347809	0.5918592
	NASDAQ	-0.1509231	0.0498785	-3.03	0.002	-0.2486831	-0.053163
	SZSE	0.0539443	0.0405682	1.33	0.184	-0.025568	0.1334566
	SSE	-0.0073635	0.0438484	-0.17	0.867	-0.0933047	0.0785777
State1							
	_cons	-0.0154717	0.0036863	-4.2	0.000	-0.0226966	-0.0082467
State2							
	_cons	0.0008238	0.0002936	2.81	0.005	0.0002483	0.0013992
	sigma	0.0067019	0.0002166			0.0062906	0.0071401
	p11	0.420801	0.2014461			0.1257095	0.7859135
	p21	0.0121866	0.010247			0.0023208	0.0614102
	N						754