CAPITAL UNIVERSITY OF SCIENCE AND TECHNOLOGY, ISLAMABAD

Impact of Sovereign Credit Rating Changes on Stock Market Co-Movements, In Case Of ASEAN and Southern Asia's Markets

by

Rabia Nawaz

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Dedicated from core of my heart to my beloved parents Mr. & Mrs. Muhammad Nawaz Khan

CAPITAL UNIVERSITY OF SCIENCE & TECHNOLOGY

ISLAMABAD

CERTIFICATE OF APPROVAL

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Abstract

This study investigates the impact of sovereign credit rating announcements on time-varying stock market correlations for a sample of five ASEAN and four Southern Asia's markets spanning from 01/07/1997 to 31/12/2015. The study employs the daily data of sovereign credit ratings plus outlooks and stock markets indices. The pairwise time-varying correlations are derived by Dynamic Conditional Correlation (DCC) modeling.The OLS regression is used to capture the effect of sovereign rating actions on stocks co-movements. Findings shows that sovereign rating and outlooks tend to be negatively related to ASEAN stock market co-movements suggesting the existence negative spillover effect of ratings and outlook changes. Analysis shows that in Southern Asia closeness of countries (geographical proximity) intensify the effect of rating changes on stock co-movements.

Keywords: Sovereign ratings, Dynamic Conditional Correlations, Stock co-movements.

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Chapter 1

Introduction

1.1 Sovereign Credit Rating

Over the last two decades, sovereign ratings have played an influential role in the financial markets, especially from the recent economic and financial crisis. The instabilities caused by crisis highlighted the credit rating agencies role and generate the financial markets interdependence in times of crisis and beyond. Sovereign rating plays a vital role in understanding the conditions that to which extent investors may access the international markets.

Sovereign credit ratings are tools used to measure the probability of default or the creditworthiness of sovereign entity. It provides an indication of the government's ability and willingness to pay its debts based on the issued terms and conditions. Credit ratings reflect the rating agency's view of the creditworthiness of economies and also play an important role in the regulation of financial markets. Since country credit ratings are a quantified measure of country risk.It provides the information on the level of risk associated with investing in a given country and helps in asset pricing for international portfolio investors, so that capital flows into global financial markets.

Credit ratings are gaining importance in the financial markets due to the increasing lack of transparency in globalization and the introduction of multifaceted financial instruments that fulfill informational needs from independent sources. In addition,

it can influence the investor pool due to its great impact. Rating agencies are known as specialized intermediaries in financial reporting and theoretically enable the efficiency of financial markets. However, the informational value of ratings and the role of credit rating agencies on the international financial system are debatable (Kaminsky and Schmukler (2002).

The reason for investor's interest in credit rating of sovereigns is that credit ratings are country risk measure and therefore affects the stock markets in given country. Credit rating agencies can be helpful for investors in decision-making by providing with information on the credit risk associated with financial investments in various economies worldwide.

As Credit rating information is useful to investors and market participants. According to Fama (1970 & 1991) market efficiency theory.This theory reports that markets adapt the price to the arrival of new information. In integrating markets, the information created in one market is also passed on to other markets. This suggests that all investors should have the same information so that they cannot have equal investment opportunities by using new information. This analysis holds the market efficiency theory in strongly manner as rating announcement behavior in one market inclines to others.

In recent past, studies has focused on sovereign ratings impact on the equity or bond market risk premium, but less attention has been paid to their impact on cross-country financial interdependencies, particularly on regional bases. However, international portfolio investors seek to exploit the different correlations between domestic and foreign capital markets in order to diversify systematic risks. Thus, the influence of sovereign rating events on cross-country correlation should be an important discussion for investors to allocate their portfolios internationally. This topic is crucial for investors and policymakers. Preferably international investors are inclined to invest in regional markets to reduce informational asymmetry. Sovereign rating announcements may have greater spillover effects among regional markets due to their geographical proximity and their belongingness in developing countries (Ferreira and Gama, 2007).

Rating agencies provides the relatively important information of credit risk assessment in financial market, in terms of rating downgrades and upgrades. Studies inspect the effect of country rating changes on stock markets shows that rating downgrades has a greater influence, while rating upgrades have no impact on stocks in emerging markets. Changes in country ratings not only directly influence the equity markets of country which is rated but also cause contagion to other countries (Brooks et al., 2004).

In particular, this study considers that sovereign rating announcements have significant impact on stock market co-movements in ASEAN and four closed border Southern Asia's countries. This study uses a multivariate dynamic conditional correlations (DCC-GARCH) framework to generate time-varying stock market correlations. It results in the estimation of pair wise stock markets correlation between countries. The estimated time-varying pair wise correlations are regressed against the sovereign credit ratings of each country to detect the combined impact of the S&P long term sovereign ratings and outlooks on stock markets of ASEAN and Southern Asia's economies.

ASEAN comprises of 10 countries. ASEAN formulated in 1967 in Bangkok .Initially IT comprises of five member countries: Indonesia,Philippines, Singapore, Thailand and Malaysia. Later on it included Brunei Darussalam in 1984, Vietnam, in 1997 Laos and Myanmar, and Cambodia. The Brunei Darussalam,Laos, Myanmar, Vietnam, and Cambodia are small market and have weak linkages regarding stock markets. This study includes only major equity markets of ASEAN; Thailand, Malaysia, Indonesia, Philippines and Singapore. To inspect if the spillover effect of sovereign credit rating changes is noticeable in closed border countries (geographical proximity), the study includes four Southern Asia's close boarder countries; India Pakistan Sri-Lanka and China.

1.2 Standard and Poor (S&P) Agency

Credit ratings are assign by credit rating agencies, which qualifies the debtor's capacity to repay obligation by making opportune interest payments and probability of default. Agencies issue's the ratings for the judgment on creditworthiness of Governments, corporations or financial instruments. Three fundamental credit rating agencies are Standard and Poor (S&P), Moody and Fitch, they publish sovereign credit ratings that assess the creditworthiness of government borrowers.Among the big three credit rating agencies S&P is far most influential on financial markets.

The study uses the data of sovereign credit ratings issued by S&P. Sovereign credit rating was first introduced in 1975 by S&P, it has become an important indicator of a country's default risk assessment. S&P ratings adjustment is more frequent than other rating agencies and revisions made by S&P give signals to other credit rating agencies in their adjustments. S&P rating announcements are less predictable by market participants so it generates a greater shock to financial markets. Standard & Poor's ratings scales are as follows. 'A' is the highest level band which include seven notches: AAA, AA+, AA, AA-, A+, A, and A-. The medium level band is 'B'. It includes nine notches: BBB+, BBB, BBB-, BB+, BB, BB-, B+, B, and B-. The lowest band is 'C' which has six notches: CCC+, CCC, CCC-, CC, SD (selective default), and D (default). Ratings above BB+ are considered to be investment grade, while others are sub-investment grade. S&P also issues the rating outlooks along with rating changes. An outlook is the signal of possible rating changes in the transitional period of 6 months to 2 years. The three outlook scales of S&P are positive, stable, and negative.

1.3 Problem Statement

In past two decades studies shown that credit rating announcements has become much more substantial due to the economic and financial crisis in markets. Financial markets shows the greater fluctuations and high frequency of rating actions.

Such a market behavior towards the rating visible in Asian markets, this serious concern needs investigations. Thus this study is design to investigate the effect of frequent sovereign rating announcements on stock market correlations in ASEAN and Southern Asia's markets.

1.4   Research Gap

This study is design to investigate the influence of sovereign credit rating changes on time varying Stock market correlations in ASEAN and Southern Asia's countries, as the regionalization and geographical proximity effect of rating changes is less captured in past studies.

1.5   Research Questions

The above discussion rises following questions:

- Whether the sovereign credit rating changes of a country influences stock return co-movement between countries in ASEAN?

- Whether the sovereign credit rating changes of a country influences stock return co-movements between countries in Southern Asia's?

- Whether the sovereign rating changes affect stock markets in closed border countries (geographical proximity)?

1.6   Research Objectives

This study observed following objectives:

- To explore the potential spillover impact of sovereign credit rating news on financial markets.

- To provide insight about the reaction of sovereign rating changes on stock market co-movements in Southern Asia's and ASEAN markets.

- To explore the stock market response towards rating news in countries that shares a geographical proximity.

1.7   Significance of the Study

This study is motivated by the perspective of frequent rating changes in times of major financial crisis in past two decades and how these crisis and fluctuation generate financial market contagions effects. Hence the purpose of the study to facilitate market participants, investors and researchers by providing useful informational value of rating changes on fluctuating stock markets. This study provides important information to Investors about credit risk assessment and solvency of financial markets to effectively manage the portfolios in selected countries to enhance their stock returns. Economic policy makers, this study may help them to understand about the information of returns and rating news spillover of Southern Asia's and ASEAN stock markets so that they make policy easily to avoid contagious of spillover. Policies may be formulated and implemented to manage the stock market returns. This study may be interest to those researchers who wish to explore the role of frequent sovereign ratings actions on Asian stock markets and to extend literature in the field of this research domain.

1.8   Organization of the Study

The study is arranged in five chapters. Chapter 1 is introduction to topic. Chapter 2 describes the literature on the relationship among sovereign credit rating and stock markets. Chapter 3 consists of methodology adopted and data employed. Chapter 4 consists of results and discussion. Chapter 5 concludes the study of recommendation policy, conclusion and direction for future research.

Chapter 2

Literature Review

Numerous studies has been conducted to determine the reaction of adjustments in sovereign credit ratings and outlooks on bonds, equity markets, foreign exchange markets, marketplace risk, volatility, financial crises intervals, financial institution investment's, and cross-border spillover outcomes of credit scores are located within the literature. In recent years, fewer studies discover the sovereign credit score rating changes influence on equity returns within the domestic as well as in international markets.

Research on the influential role of changes in sovereign ratings prospered in the 1990s. Reisen and von Maltzan (1999) have contended that ratings news add to boom-bust cycles in the universal markets. This contention is to a great extent in view of the notion that country's ratings really give new information to the financial markets. Specifically, there are few examinations that emphasis on the effect of rating actions on stock pricing. Few investigations which encourage changes in ratings significantly affect equity markets; Cantor and Packer, (1996); Kaminsky and Schmukler (2002); Ferreira and Gama (2007) Bissoondoyal-Bheenick, (2004); Chiang, Jeonand Li (2007); Kim and Wu (2008); Hooper et al., (2008); Christopher et al., (2012); Bissoondoyal-Bheenick, (2012).

Reinhart (2002) investigate sovereign credit rating plays an influential role to determine the conditions in which countries can access to international financial markets. Sovereign credit ratings are intended to serve as a summary measure of

a country's probability of default. The study inspects impact of sovereign ratings in cross section of countries and found that countries with lowest rating are less able to borrow from international capital market. The country's ratings also affect the conditions under which the private sector can absorb loan from international sources.

According to Kaminsky and Schmukler (2002) sovereign ratings and outlook adjustments affect the financial markets of the emerging economies. Results report that rating changes affect both the debt and equity instruments, also found the affect rated country markets as well as create cross-country spillovers. The shocks of rating and outlook actions are more noticeable in crises, in non-transparent economies and in nearby countries. Rating improvements usually occur during financial market integration, while downgrades occur during the downturn in markets. Study reinforces the view, that rating agencies contribute to the instability of emerging markets.

Gande and Parsely (2005) study distinguishes the common information and differential information components of spillovers caused by changes in sovereign rating. The common information spillover effects suggest that the spreads of the government bonds are moving in tandem so that rating changes generate the positive effects, while the different spillover effects should lead to the negative effects of rating events in the individual countries.

Kim and Wu (2008) use a panel data framework to investigate the sovereign credit ratings changes effect on domestic level financial sector development and international capital flows. Study observed that long-term sovereign credit ratings are critical for reinforcing economic intermediary development and for attracting domestic capital flows however discourage international capital flows, even as short-time period slow down all sorts of financial tendencies and capital flows.

Shahzad, (2013) studies the importance of credit rating agencies on capital markets, and the influence of regulatory decisions that are taken to increase the quality of information available to the capital markets. Results suggest that the capital markets participants believe that credit ratings have strong association with information that is publically available. Financial regulations introduced in last decade

improved the available quantitative and qualitative information to the capital markets.

Bissoondoyal-Bheenick (2012) uses the event study framework to examine spillover effect caused by rating changes in one country on other countries. Study use sets of countries of trade and financial markets linkages. Results indicate good sized spillover in financially linked markets whilst the trade links in economic markets shows lesser impact. Furthermore a contagion impact for each upgrades and downgrades among the international market is also observed.

Minescu (2010) argues that investors shows interest in sovereign credit ratings news for three reasons. Firstly, the sovereign rating changes specify the borrowing cost for government. Secondly, a huge number of investors are restrained to particular geographical areas in which they could make investments to bare a threat, where sovereign credit ratings may be used to degree threat. Subsequently, Sovereign rating downgrades movements have a demonstrated impact.

Hill, Brooks and Faff (2010) inspect variant in credit quality evaluation throughout three fundamental rating agencies (Standard and Poor's, Moody's and Fitch). Findings suggest that there is often disagreement on credit quality between credit rating agencies.outlook and watch are commonly robust predictors of rating adjustments process relative to different public facts.

Another recent Study by(Hill and Faff 2010) examine the market effect of different credit rating moves (ratings changes, watch and outlooks). The study reviews that S&P incline to be greater active and timely in imparting rating calculations and provide more new facts than different agencies. Some proof of stronger reaction to adjustments in S&P rating exams is likewise located, than in different businesses. Findings additionally advocate that credit outlook and credit-watch activities are extra informative than downgrades and upgrades in rating.

As the earlier research indicates robust marketplace reactions to outlook and watch alerts, which contain extra new information than ratings. Alsakka and Gwilym, (2012) inspect the impact of sovereign watch and outlook signals from

S&P, Moody's and Fitch. Study suggests that the agencies actions has distinctive guidelines such as S&P has extra importance in short-time period accuracy of rating moves.

Chen et al. (2013) investigate how Sovereign credit rating changes influences the real private investment of re-rated countries. A significant transitory increases in private investment growth is observed by upgrades in sovereign ratings and significant temporary declines is found by sovereign rating downgrades.

Hu, Kaspereit and Prokop (2016) examine the response of intra-industry stock marketplace and firm-particular stocks on S&P rating modifications and outlook placements for the pattern of G7 countries. Results suggest rating downgrades have a substantial contagion results for the UK, US and Italy stock markets, however no effect for rest of G7 nations.

Suba (2008) investigates the sovereign rating and outlooks impact on stock returns,exchange rates, and their volatility in Turkish markets. Rating downgrades shows the effect while rating upgrades do not create a significant market impact on Turkish markets. Moreover, the sovereign rating downgrades induce a decline stock volatility in post announcement periods.

Klimavičienė (2011) uses event study approach to measure the reaction of rating announcements by S&P, Fitch and Moody's, on three Baltic stock markets. Study shows that downgrades have larger impact than those of upgrades. The rating declaration impact is unique throughout the three Baltic stock markets, as it depend up on the agency issuing the rating. Thus Investors in Baltic markets manage to get the price relevant information by rating announcements.

Cruz de Souza, Dal-Ri and Borba (2013) uses the three event to examines the country rating announcements impact on Brazilian stock markets. Study confirms that announcements contain data content material, as bad news affects stock market returns by means of inflicting abnormal returns.

Poon and Chan (2008) carried out a cross-sectional regression approach to measure the content informational material of rating announcements in China .The take

a look at states an uneven certification impact and informational value of China rating changes.

Korkeamäki, Pöyry and Suo (2014) studies whether or not local credit ratings lessen data asymmetric conduct in Chinese marketplace with the aid of investigative the loans issued. No matter the not unusual criticism regarding the exceptional of China's credit ratings, outcomes indicate that credit score scores play an important function in reducing asymmetry in China's markets.

A similar research is presented by Joo & Pruitt (2006) performs empirical inspection of changes in credit rating in the periods of economic instability. The Korean Financial Crisis as an experimental stimulus shows that changes in the Korean bond rates during the financial crises led to significantly larger stock price changes than before or after of the crisis.

Linciano (2004) analyzed response of Italian listed companies stock returns to announcements by Moody's, Fitch and S&P. The study results reports that overall influence of rating announcements are fairly moderate or insignificant.

Ferri, Lui and Majnoni (2001) inspect the role of sovereign rating assessments on firm-level rating changes in less developed countries, uses a sample of 20 firms rated by Moody's. Results report that there is a stronger association between firm's ratings and sovereign ratings in less income countries.

Li, Shin, & Moore (2006) inspection reveals the evidence that international rating agencies are more influencing instead of Japanese local rating agencies in case of rating downgrades. Results also states that upgrades events do not influence the local stock market for both global as well as local rating.

Almeida, Cunha, Ferreira and Restrepo (2014) inspect the reaction of downgrades in sovereign rating on firm's financial and investment decisions. The study found a causal effects of sovereign downgrades on corporate ratings .Results reports that sovereign downgrades causes a greater decreases in investment and leverage of firms.

Duygun, Ozturk and Shaban, (2016).investigates components of the connection between sovereign credit score scores and financial discipline for ninety three nations at some stage in the 1999-2010 period. Study determines that enterprise pleasant is an important factor within the rankings-economic dating.

Bremer and Pettway (2002) used event study methodology to study the influence of Moodys rating announcements on bank stocks. Study examined the effect of rating downgrades on Japanese bank equity prices. Study indicate a strongly on negative rating announcements effect on banking industry.

Kim and Wu (2011) examine impact of changes in sovereign credit assessments to determine international bank flows in 55 emerging countries. Study results indicate that sovereign credit rating changes have significant and positive influences on international bank flows from developed markets.Strong regional rating spillover effects is found, ratings upgrades in one region tend to reduce bank flows to the others.

Kim and Wu (2011) observe impact of adjustments in sovereign ratings to determine international financial institution flows in fifty five emerging nations. Study indicates that rating changes have substantial positive effect on international bank flows in advanced markets. Regional spillover results are found, while ratings improvements in a single area have a tendency to lessen financial institution flows to the others.

Schweitzer, Szewczyk and Varma(1992) observe a comparative impact of scores adjustments to investigate if the impact of credit score rating modifications on corporates isn't the same as the ones on banks. In rating improvements no statistically distinction found, however downgrades have more great impact on banks greater than corporates.

Gropp and Richards (2001) uses event study framework to observe the reaction of rating announcements by S&P, Moody's and Fitch on European banks. The results states that upgrades indicate the positive abnormal returns for stock prices and negative abnormal returns on bond prices on the announcement day.

Williams, Alsakka and Gwilym (2013) observe the influence of rating changes by S&P on the ratings of banks domiciled in emerging markets. A strong connection between sovereign ratings and bank rating change is found.

Kang and Min (2015) apply the panel vector auto regression (VAR) approach to observe the effect of the sovereign credit rankings on seven East Asian emerging countries. The study estimation show that credit rating has less effect, while outlook changes have stronger impact on the stock indexes, credit default swap (CDS) and GDP growth.study states rating upgrades and outlook has more potent results on all three variables than score downgrade and bad outlook. Rating and outlooks show greater effect after the financial crisis.

Ismailescu and Kazemi (2010) observe sovereign rating changes reaction on CDS spreads for a sample of twenty two emerging markets. The evidence found that rating announcements has spillover effect on other emerging CDS markets. When rating events are positive, it creates a greater effect on CDS markets.

Arezki, Candelon, & Sy (2011) observe the spillover results of sovereign score information on CDS spreads and European stock market indices.The examine reviews the statistically and economically substantial spillover impact of downgrades on each cross-country and across financial markets.

Afonso, Furceri & Gomes (2011) use the event study technique to measure the consequence of sovereign score announcements on sovereign bond yields and CDS spreads in European countries also take a look at causality between credit score rating modifications and CDS spreads. The result imply a vast response of the bond yield spreads to changes in rating and modifications inside the outlook.

Alsakka and Gwilym (2013) observe the influence of rating events on foreign exchange marketplace earlier than (2000-2006) and in span of global crisis (2006-2010), include an extensive set of Europe and crucial Asia countries as a way to look into spillover results. Rating revisions by way of three most important organizations sign spillover impact in the rated country in addition to other international exchange rate markets. Crisis period shows greater spillover effect than pre crisis period.

Alsakka and Gwilym (2012) uses Fitch, Moody's and S&P credit signals to analyze their response on spot markets of foreign exchanges. Both directions of credit ratings significantly influence the domestic and international exchange rate markets. Markets reacts strongly to S&P negative outlook changes and Fitch ratings timely responses to the market. Emerging versus developed economies reacts differently to rating events.

Bissoondoyal-Bheenick, Brooks, Hum and Treepongkaruna (2011)explores the response of foreign exchange price volatility through the modifications of sovereign ratings with the help of more than one rating agencies at some stage of Asian crisis. Results show that the downward rating increases the volatility of foreign exchange rates. Rating downgrades by multiple sources has greater effect on volatility in comparison to single source.

Treepongkaruna and Wu (2012) investigate the influence of sovereign rating changes on volatilities of stock currency market and asset correlations around financial crises of 1997. Study use intraday market data for 9 Asia-Pacific countries.The study results indicate that stock and currency markets react differently to rating events. Rating news are more influential on stock markets than currency markets. Rating activities have asymmetric and sizeable results on intraday data, domestic market characteristics effect rating events all through economic crises.

Corbet (2014) examines the contagion effects of sovereign downgrades on European financial markets by using vector auto regression (VAR) techniques. Study reports the presence of spillover effects of sovereign downgrade across on equity indices, Credit Default Swaps (CDS) and bonds. Rating downgrades are found to causes a significant increase in equity returns in European markets.

Brooks, Faff, Treepongkaruna and Wu (2015) inspect S&P revision on peak trends of stock returns within the recent duration of the crisis. The observe found that the higher equity markets are more aware of sovereign downgrades during economic crises, but the impact at the inventory markets isn't always the same in one of a kind monetary crises. Improvements and downgrades in ratings affect the asymmetry within the expected direction during course of crisis.

Chen, Cheng and Yang(2011) use a broad set of 120 sovereign credit ratings data issued by S&P, Moody's and Fitch. Study use panel of equity indices and 10 macroeconomic variables for each country.Results report that sovereign ratings negatively influenced the equity returns.

Cantor and Packer (1996) examine the response of government bond yields by changes in sovereign rating by using data for the 79 ratings announcements on a sample of 35 industrialized and emerging markets. Study reports that the upgrades announcements leads to decline in the government bond yield spreads.

Reisen and Maltzan (1999) investigate the reaction of marketplace trading for30 days earlier and afterward rating announcements. Result indicates enormous impact of impending improvements and downgrades on emerging markets bond yield spreads. study imply that us of a score has the capacity to reduce investor euphoria on rising markets bonds, additionally argued that rating corporations make a contribution to increase-bust cycles in worldwide markets.

Liu, Seyyed and Smith (1999) examine the independent impact of the rating refinement by Moody's on bond yield premiums. Study found rating downgrade has a statistically significant change on bonds yield spread. The evidence of rating refinement impact on bond prices suggests that rating agencies provide information content to financial markets and investors.

Kraussl (2000) uses the VAR technique to have a look at the connection of sovereign rating movements and government bond yield spreads. In assessment to previous studies, their study concludes that an unexpected sovereign rating change does no longer always have an immediate effect on bond yield spreads in emerging markets.

Kräussl (2005) examines the credit rating agencies role in international debt markets in sample of 28 economies including India, Pakistan and China.Outcomes of event study specifies that sovereign score changes have tremendous impact on the size and volatility of on bond marketplace in rising economies.

Böninghausen and Zabel (2015) studies spillovers of sovereign rating changes across bond markets, By using rating announcements by the three major agencies (Standard & Poor's, Moody's, Fitch) and bond market for 73 developed and emerging countries. Strong negative spillover effects from downgrades, positive spillovers from upgrades are found. Negative spillover effects are more evident for countries within the same region.

Afonso, Gomes and Taamouti (2014) uses EGARCH specifications to investigates the reaction of European bond and stock markets volatilities to sovereign credit rating announcements by a panel of daily stock and bond market returns.The estimated result shows that rating downgrades rises the stock and bond volatilities but no significant impact is found by upgrades. A fair cross-country interdependence found in European markets,as sovereign rating upgrades (downgrades) in one country results to a decrease (increase) in volatility in other countries.

Steiner and Heinke (2001) observe the influence of US rating modifications to German euro bond returns by using event study technique. Results found that bond prices substantially react in case of downgrades and negative outlook changes, while the improvements and positive modifications in the outlooks did not cause assertion in returns. A bad news (downgrades and poor changes in the outlook) creates an excess response inside the markets.

Hand, Holthausen and Leftwich(1992) observed the daily excess returns on both stocks and bonds associated with announcements made by Standard and Poor and Moody's. Study concludes that significant average excess stock returns were observed in the cases where there was an indication of a downgrade but not in the cases of indicated upgrades.

Gatti, Colla and Calderoni (2009)investigate the reaction European stocks react to sovereign rating actions issued by Moody's in the period 2002-2007. Findings show that the reaction to rating changes information is asymmetric in EU markets. Stocks are negatively influenced by Downgrades and upgrades show no significant impact on equity prices, negative impact of rating downgrades is stronger in non-UK firms and for non-financial firms, which signifying a lower information asymmetry in UK than in other European markets.

Han et al. (2009)inspected the reaction of sovereign rating changes on stock returns of 29 emerging marketplace countries by using MSCI stock indices data. inventory markets significantly react to American depository receipts (ADR). Consequences indicate that in ADR markets substantial cumulative odd returns for downgrades and upgrades is observed.

Brooks et al. (2012) makes use of the panel regression method to observe the impact of changes in sovereign ratings on stock marketplace for 75 countries, in order to decide whether or not sovereign credit rankings destabilize equity markets at some point of financial crisis periods. The examine reviews that found sovereign credit score rankings did not destabilize stock markets in the course of financial crises.

Griffin and Sanvicente (1982) apply one year event window to inspect the response of stock price to changes in credit rating.Results imply downgrades causes a considerable cumulative abnormal returns for the 11 months earlier the event and also inside the month of rating event. However credit rating improvements do not influences the prices.

Bissoondoyal-Bheenick, Brooks and Treepongkaruna (2014) make use of event study framework to examine the effects of particular rated country on the equity markets of the countries to which it is closely linked. The study tests the combined impact of rating adjustments in different sovereigns at the stock market return of individual country. Results report upgrades have pre-announcement impact while rating downgrades indicate a post announcement case in some countries.

Michaelides et al. (2012) follow event study approach to take a look at the impact of sovereign debt rating modifications on stock market returns for sixty five countries. Results state that the stock market returns significantly changes on pre-announcement of sovereign rating downgrade, but the stock market reaction is weaker at event day also the influence of upgrades is much weaker.

Mateev (2014) examines country-specific and across the border spillover effects of rating changes, uses the methodology of event studies to capture the dynamic outcomes across the time of adjustments in rankings. Results reports changes in

sovereign ratings of one country triggers significant changes in bond and equity market returns in different neighboring countries. Study determined that spillovers caused by rating downgrades are found to be more potent at regional level.

Holthausen and Leftwich (1986) found the evidence of negative abnormal stock returns in respond to S&P and Moody's rating downgrades,while upgrades causes no reaction on stock returns. North and Weber (2004) also achieved a very similar result where the stock market stocks has a significantly negative return in reaction of downgrades, but shows only insignificant reactions to the positive rating news.

Favero and Giavazzi (2002 Use the vector autoregressive (VAR) technique, The study found rating downgrades have significant spillover effects on cross country markets. whereas upgrade do not much influence across country markets.

Wu and Treepongkaruna (2008) apply panel regression method look at the response of rating announcement on volatilities of currency market and realized returns and their correlations in financial crises period for 5 Asia-pacific nations (Hong Kong, Australia, Korea, Singapore and Japan). Estimation reports that adjustments in ratings have great and asymmetric consequences on higher moments of equity and foreign exchange marketplace returns.

Fatnassi, Ftiti and Hasnaoui(2014) apply panel regression technique to assess the response of the European stock market returns to sovereign rating changes by three agencies; (Moody's Fitch, and S&P agencies). Results indicate that rating downgrades and upgrades significantly influences the cross country stock returns. Negative rating news from all three agencies are more influencing than positive news.

Li et al. (2008) make use panel regression methodology to examine the impact of changes sovereign rating revisions on own country and stock market co-movements for a sample of five Asian sovereigns.The study states that sovereign credit rating announcement significantly influences the stock returns in own and across the country markets. Financial crisis of 1997 does not show a pro market behavior to credit rating agencies but found a significant contagion impact of rating changes in one country to other countries in crisis.

Sensoy (2016) uses cDCC-GARCH modeling to observe sovereign rating announcements effect on Latin American stock markets; (Mexico Chile and Brazil) for period 2002 to 2013. The study reports that in general rating announcement do not significantly influence the stock return co-movements in three countries. Study also concludes that an upgrade country which lies in an investment grade level is possibly more positively diversified than other countries in the region.

Another recent study by Eraslan (2016), uses the corrected Dynamic Conditional Correlation (cDCC) approach to investigates the sovereign credit ratings spillover impact on time-varying exchange rate return correlations for a dataset of 11 emerging markets for the period 2002-2015. Study found that some of the emerging market significantly influences the exchange rate co-movements.Downgrades of Fitch and upgrades of Moody's leads to spillover in emerging markets.

Cristopher, Kim and Wu (2012) apply DCC-GARCH framework to generate time varying bond and stock market correlations (DCCs) in 19 emerging countries.Error correction model is used to investigate the reaction of sovereign rating changes on stock and bond market co-movements. Ratings and outlook announcements influences positively to stock market co-movements, but negatively respond to bond market co-movements with in a region. Study concludes that rating information negatively influence more in countries of higher foreign currency debt ratings with respect to regional rating average.

Chiang, Jeon and Li (2007) apply DCC-GARCH technique on daily data of stock returns for nine Asia Pacific countries to observe the contagion before and throughout Asian crisis. Study examines the reaction of stock correlation-coefficient series to new information. Thus reveals that global sovereign rating agencies play an extended role in determining the dynamic correlations inside the Asian markets.

Hwang, Ln and Kim (2010) apply DCC-GARCH frame work on data set of 38 countries. Study observes the financial contagion effects in emerging and developed stock market co-movements during the U.S. subprime crisis. Both positive and negative rating news create the significant spillover. Study reports the differential spillover effect for positive rating changes, while common information spillover is observed in case of negative rating news.

Brooks et al (2004) examines the overall effect of country rating changes on the cross-country financial market. Results indicate that downgrades in ratings negatively influences the aggregated market returns. At domestic level downgrades significantly affect the equity and currency markets. The study concludes that sovereign rating changes do not shows the informational sensitivity in emerging markets.

Hooper, Hume and Kim (2008)makes use of database of 42 sovereigns to check out the impact of sovereign ratings at international markets. Overall results report that rating agencies offer new marketable facts to stock marketplace and foreign exchange markets. Rating changes indicate a substantial positive impact on the on stock markets, as the stock prices increases, but has a negative relationship with the volatility. Moreover study found asymmetric effects of rating announcements.

Ferreira and Gama (2007) display the contagion impact of the sovereign rating announcements on across the border stock market returns. The study shows the evidence that sovereign rating and outlook changes of a country has an asymmetrical and significantly influences the across the country stock markets Results indicate that downgrade announcements have a significant negative spill-over effect on cross country markets, while upgrades show no significant results. Country characteristics based on geographic closeness and emerging market status amplify the impact of sovereign rating spillover.

Gande and Parsely (2005) examine the effects of rating changes of a country on the government bonds of other countries. Study found an indication of contagion effects, rating change in a country has a significant impact on the spreads of government bonds in other countries. This effect is asymmetric: Positive foreign rating events have no appreciable impact on government bonds, while negative rating events are associated with an increase in spreads. Unlike study of Ferreira and Gama (2007) they proxy variables for cultural or institutional linkages (common language, formal trade blocs, and common legal systems), geographical proximity, and rule of law traditions across countries do not seem to affect estimated spillover effects.

2.1 Hypotheses

H1. There is a significant spillover impact of sovereign credit rating news on stock markets.

H2. There is a significant impact of sovereign credit rating changes on stock market co-movements in ASEAN.

H3. There is a significant impact of sovereign credit rating changes on stock co-movements in Southern Asia's markets.

H4. There is a significant sovereign rating changes effect on stock markets in countries of geographical proximity.

Chapter 3

Data Collection Methodology

3.1 Data Collection

The study employs the daily data of sovereign credit ratings and stock markets indices return of US, Indonesia, Malaysia, Philippines, Singapore, India, Pakistan, Sri Lanka and china.Southern Asia markets are represented by Pakistan, India and Sri Lanka. ASEAN markets are represented by Indonesia, Philippines, Malaysia, Philippines and Singapore. US stock return is used as global factor in return equation. The period of study is starting from 01/07/1997 to 31/12/2015.

3.1.1 Stock Markets Variables

Countries	Index
United States of America	Standard and Poor 500 index
Indonesia	Jakarta Stock Exchange
Thailand	Bangkok Stock Exchange of Thailand
Philippines	Philippines Stock Exchange
Singapore	Singapore Stock Exchange
Malaysia	Kuala Lumpur Stock Exchange
Pakistan	Karachi Stock Exchange
China	Shanghai Stock Exchange

Countries	Index
Sri Lanka	Colombo Stock Exchange
India	Small and Poor Bombay Stock Exchange

3.1.2 Sovereign Credit Ratings Variable

To collect the sovereign credit ratings announcement, data is extracted from Standard & Poor's credit rating agency, the data of sovereign ratings is collected from S&P publication in Credit Week, spanning from 01/07/1997 to 31/12/2015. There are reasons for using this data. S&P ratings adjustment is more frequent than other rating agencies and revisions made by S&P give signals to other credit rating agencies in their adjustments. S&P rating announcements are less predictable by market participants so it generates a greater shock to financial markets (Brooks et al 2004). Although sovereign ratings issued by S&P are available in foreign currency as well as local currency Rating and Credit Outlook, however this study uses only Foreign Currency Long Term Rating and outlooks.

This study employs two types of rating measures. The first one is long-term foreign currency sovereign credit ratings, which represent a country's likelihood to default on foreign currency denominated sovereign bonds. Standard & Poor's ratings scales are as follows. 'A' is the highest level band which include seven notches: AAA, AA+, AA, AA-, A+, A, and A-. The medium level band is 'B'. It includes nine notches: BBB+, BBB, BBB-, BB+, BB, BB-, B+, B, and B-. The lowest band is 'C' which has six notches: CCC+, CCC, CCC-, CC, SD (selective default), and D (default). Ratings lies in investment grade are above BB+, while below BB+ are included in sub-investment grade.

This study also uses the rating outlooks along with rating changes. An outlook is the signal of possible rating changes in the future period of 6 months to 2 years. The three outlook scales of S&P are positive, stable, and negative.

In order to use ratings data, study uses a similar method proposed by Gande and Parsley (2005); Chiang, Jeon & Li (2007) and Ferreira and Gama (2007). The linear transformation of rating is done by assigning numerical values to each

rating notches. As there are a total of 22 notches, the highest rating notch is 'AAA' which is assigned by 21 and 'SD' is the lowest notch which is assigned by value 0 (zero). A 'Stable' outlook adds nothing to the value of rating, while 'Positive' and 'Negative' outlooks add the value of 1/3 and 2/3 to credit rating.

A comprehensive credit rating (CCR) value is generated by adding both the rating and outlook values. For instance, a country rating is issued as BB+ with no further information on its credit outlook, the comprehensive credit rating value is 11. On next rating announcement S&P changes the country rating to BB+ with positive outlook to for a possible improvement; the new rating value would be 11.3.

3.1.3 Numerical Scaling of Sovereign Ratings

Sovereign Credit Rating	Numerics
AAA	21
AA+	20
AA	19
AA-	18
A+	17
A	16
A-	15
BBB+	14
BBB	13
BBB-	12
BB+	11
BB	10
BB-	9
B+	8
B	7
B-	6
CCC+	5
CCC	4

Sovereign Credit Rating	Numerics
CCC-	3
CC	2
C	1
SD, D	0
Outlook	**Numeric Scale**
Positive	0.6
Stable, Watch Developing	0
Negative	-0.3

3.2 Methodology

3.2.1 Dynamic Conditional Correlation (DCC-GARCH)

In most of earlier studies event study methodology and traditional correlation analysis is used to examine the influence of sovereign rating changes on financial variables. This study uses the approach of dynamic conditional correlation (DCC-GARCH) in order to capture the impact of sovereign rating changes on stock market co-movements.

This study adopted the Dynamic Conditional Correlation (DCC) specification proposed by Engle (2002). A multivariate DCC-GARCH framework is estimated to generate time-varying individual country stock indices return correlations with other countries' stock markets in a region. Which results the estimation of pair wise dynamic conditional correlations (DCCs) between countries.

In DCC-GARCH model correlation coefficients of standardized residuals are to be estimated and then heteroscedasticity is directly measured in this model. To measure the global exogenous factor an additional explanatory variable can be added in the mean equation. This study includes the U.S. stock returns as an exogenous global factor.

There is a three-step process to estimate the model.In first step of process univariate GARCH(1,1) is estimated for each of the stock returns. On next step,

the intercept parameters are attained by transforming stock returns and on final stage dynamics conditional correlations (DCC) coefficients are estimated. The closest studies with same methodologies are of Chiang, Jeon and Li (2007) and Christopher, Kim and Wu (2012).

The DCC-GARCH process starts with return equation as:

$$r_t = \gamma_0 + \gamma_1 r_{t-1} + \gamma_2 r_{t-1}^{U.S.} + \varepsilon_t \tag{3.1}$$

where $r_t = (r_{1,t}, r_{2,t}, \cdots, r_{n,t})$, $n = 10$; $\varepsilon_t = (\varepsilon_{1,t}, \varepsilon_{2,t}, \cdots, \varepsilon_{n,t})$

γ_1 represent the autocorrelation 'AR(1)' of stock returns. γ_2 in return equation is used in order to account for global factor of one-day lagged U.S. stock.

The conditional covariance matrix of asset Returns are estimated as;

$$H_t = D_t R_t D_t$$

where, D_t is $(n \times n)$ diagonal matrix of time-varying standard deviations from univariate GARCH models with $\sqrt{hii, t}$ on the ith diagonal.

Variance equation is calculated as;

$$h_{ii,t} = c_i + \alpha_i h_{ii,t-1} + b_i \varepsilon_{i,t-1}^2 \quad i = 1, 2, \cdots, n \tag{3.2}$$

The conditional covariance matrix H_t is estimated in two stages. Firstly univariate volatility models are fitted for each stock returns and estimates of $\sqrt{hii, t}$ are obtained. On stage two, stock-return residuals are transformed by their estimated standard deviations from the first stage $u_{i,t}$.

R_t is the $(n \times n)$ conditional correlation correlation matrix.

$$R_t = (Q_t^*)^{-1} Q_t (Q_t^*)^{-1}$$

Q_t^* is the diagonal matrix containing the square root of elements of the main diagonal Q_t.

Engle (2002) used a GARCH-type structure to model conditional correlation dynamics. Indeed, DCC process is written as follows

$$Q_t = (1 - \alpha + \beta)\overline{Q} + \mu_{t-1}\acute{\mu}_{t-1} + \beta Q_{t-1}$$

where, $Q_t = (q_{i,t})$ is the $(n \times n)$ time-varying covariance matrix of u_t.

$u_{i,t} = \varepsilon_{i,t}/\sqrt{h_{ii,t}}$ is the vector containing standardized residuals.

$\overline{Q} = \mathrm{E}[u_t u_t\text{'}]$ is unconditional variance-covariance matrix.

α and β are nonnegative scalar parameters satisfying $(\alpha + \beta) < 1$.

Piar wise Dynamic Conditional correlations are estimated as follows:

$$p_{ij,t} = q_{ij,t}/\sqrt{q_{ii,t}q_{jj,t}} \quad i,j = 1,2,\cdots,n \quad \text{and} \quad i \neq j \tag{3.3}$$

As proposed by Engle (2002), the DCC model can be estimated by using a two-stage approach to maximize the log-likelihood function. Let θ denote the parameters in D_t, and Φ the parameters in R_t, then the log-likelihood fund is:

$$L_t(\theta, \Phi) = \left[-\frac{1}{2}\sum_{t=1}^{T} \left(n\log(2\pi) + \log|D_t| + \varepsilon_t' D_t^{-2}\varepsilon_t \right) \right]$$

$$+ \left[-\frac{1}{2}\sum_{t=1}^{T} \left(\log|R_t| + u_t' R_t^{-1} u_t - u_t' u_t \right) \right]$$

The first part of the likelihood function is volatility, which is the sum of individual GARCH likelihoods. The log-likelihood function can be maximized in the first stage over the parameters in D_t. Given the estimated parameters in the first stage, the correlation component of the likelihood function in the second stage can be maximized to estimate correlation coefficients.

3.2.2 Sovereign Rating Changes Effect on Stocks Co-Movements

The OLS regression model is used to investigate the impact of the long term sovereign rating changes of each country on the pairwise time-varying correlation coefficients.following OLS regression model is estimated.

$$\rho_{ij,t} = \phi_0 + \phi_1 \rho_{ij,t-1} + \omega_{1s} I_{i,t-s}^{(Ts)} + \omega_{2s} I_{j,t-s}^{(Ts)} + \varepsilon_{ij,t} \tag{3.4}$$

where $\rho_{ij,t}$ is pairwise dynamic conditional correlation between stock indices returns of country 'i' and 'j'. $I_t^{(Ts)}$ is an indicator variable to measure the effect of rating changes actions of each sovereign at time 't'. $I_{i,t}^{(Ts)}$ and $I_{j,t}^{(Ts)}$ are used for measuring impulse effect sovereign rating in country 'i' and 'j'. 's' is the time window spanning from (t-1) to (t+1). ω_{1s} and ω_{2s} are the constant coefficients.

The indicator variable for s = -1, 0, and 1 takes the form of:

$$I_{ij,t}^{(Ts)} = \begin{cases} \Delta V & t = Ts \\ 0 & t \neq Ts \end{cases}$$

where Δ_V denotes the amount of a change in the sovereign credit ratings, and outlooks. For instance, for a downgrade of one notch, $I_{i,t}^{(Ts)}$ = -1 and for an upgrade of two notches, $I_{i,t}^{(Ts)}$ = 2. In the case of an outlook change from positive to stable or from stable to negative, by using the same transformation, the rating score is changed by -1/3. If there is any outlook change from positive to negative, then the rating score is changed by -2/3.

Chapter 4

Results and Discussion

4.1 Descriptive Statistics

Table 4.1: Descriptive Statistics of Southern Asia's and US markets.

	RIN	RPK	RS	RUS
Mean	0.000266	0.000605	0.000319	0.000121
Median	0.000000	0.000000	0.000000	0.000000
Maximum	0.159900	0.018492	0.182872	0.109572
Minimum	-0.118092	-0.019203	-0.139055	-0.094695
Std. Dev.	0.013053	0.001634	0.009354	0.010472
Skewness	-0.100423	-0.476230	0.268489	-0.247351
Kurtosis	13.27023	21.41656	50.14727	15.26906
Jarque-Bera	29703.30	95731.59	625817.8	42443.06
Probability	0.000000	0.000000	0.000000	0.000000

RPK is returns of Pakistan, RIN is returns of India and RS is returns of Sri Lanka stock markets RUS is returns of United States.

Average return of India market is 0.06%, mean return of pakistan market is 0.06% ,mean return of Sri Lankan market is 0.03% and average return of US market is 0.02%. The maximum return of Pakistani market is 12%, maximum return of Indian market is 15% and maximum return of Sri Lankan is 18%. The maximum loss incurred in one day by stock markets of Pakistan, India and Sri Lanka 13%,

11% and 13% respectively. The average standard deviation in returns of stock markets of Pakistan and India is 0.016% and 0.013. Average standard deviation in Sri Lanka and US stock markets are 0.009% and 0.01%. The returns of all markets are found negatively skewed except Sri Lanka whereas the value of Kurtosis indicates that data is peaked. The Jarque-Bera test confirms the non-normality of the returns of stock markets of Pakistan, India Sri Lanka and US.

TABLE 4.2: Descriptive Statistics of ASEAN markets.

	RI	**RM**	**RP**	**RSG**	**RT**
Mean	0.000272	0.000665	0.000134	0.000545	0.000121
Median	0.000000	0.000000	0.000000	0.000000	0.000000
Maximum	0.131277	0.208174	0.564300	0.128738	0.113495
Minimum	-0.127321	-0.241534	-0.555620	-0.091535	-0.160633
Std. Dev.	0.013571	0.011735	0.015402	0.010969	0.013164
Skewness	-0.208087	0.551916	0.441002	0.026619	0.055558
Kurtosis	15.46927	89.39703	525.2486	15.54662	15.92021
Jarque-Bera	43823.59	2101896	76788896	44320.42	47001.72

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

The markets Indonesia, Malaysia, Philippines, Singapore and Thailand average returns are 02%, 0.006%, 01%, 0.005% and 01% respectively. Maximum return per day is 13% for Indonesia, 20% for Malaysia, 56% for Philippine, 12% for Singapore and 11% for Thailand. Maximum loss incurred by stock markets of Indonesia, Malaysia, Philippine, Singapore and Thailand as 12%, 24%, 55%, 09% and 16% as reported above table. Moreover, the returns are found negatively Skewed. The value of kurtosis is higher than 3 indicating that data is leptokurtic. Philippine market is must volatile market with 1.54% variation per day followed by Indonesian and Thailand markets. The Jarque-Berra test rejects the null hypothesis of normality.

TABLE 4.3: Descriptive Statistics of pair wise DCCs in ASEAN markets.

	IND-MAL	IND-PHI	IND-THI	MAL-PHI	MAL-THI	PHI-THI
Mean	0.053696	0.039690	0.082846	0.246694	0.305129	0.248366
Median	0.048550	0.034289	0.073492	0.244330	0.304765	0.245877
Maximum	0.232062	0.226583	0.261162	0.350735	0.431021	0.395874
Minimum	-0.052992	-0.073125	-0.033022	-0.039026	0.100846	0.033046
Std. Dev.	0.038813	0.039007	0.045183	0.037037	0.041979	0.036758
Skewness	1.178195	1.074781	1.188221	-0.846222	-0.734367	0.178348
Kurtosis	5.689864	5.338896	4.541723	8.937739	5.727518	5.338459
Jarque-Bera	3599.807	2840.632	2258.864	10731.09	2701.425	1575.168
Probability	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000

The pair wise DCCs of ASEAN markets provide a summary descriptive of all variables. Accordingly summary statistics displays the values of mean, median, mode, kurtoses, minimum, maximum, skewness, variances and Jarque-Bera. Mean values shows the central tendency of the estimated correlations. Positive and negative values shows that pair wise correlations are Skewed in both direction. Std deviation values shows high volatility of returns. Kurtoses show the peakness and flatness of the correlation series and jarque-Bera is confirming the normality of stock market co-movement of series. The Jarque-Berra test rejects the null hypothesis of normality.The value of kurtosis is higher than 3 indicating that data is leptokurtic.

4.2 Graphical Representation of Pair Wise DCCs in ASEAN

RIND_RMA
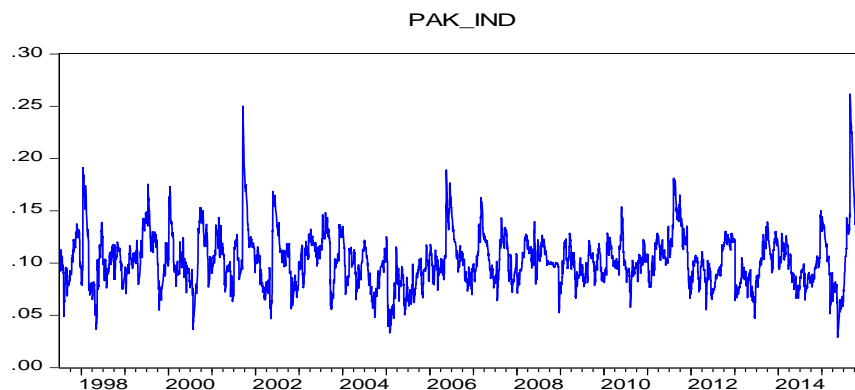

MAL-PHI

IND-THA

MAL-THA

PHI-THI

IND_PHI
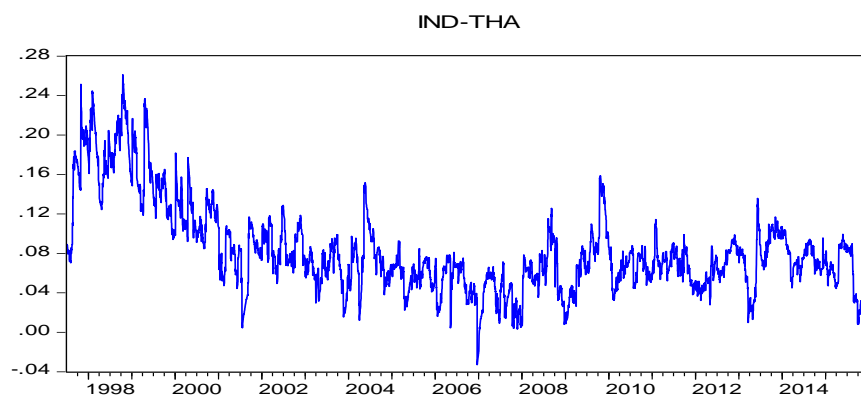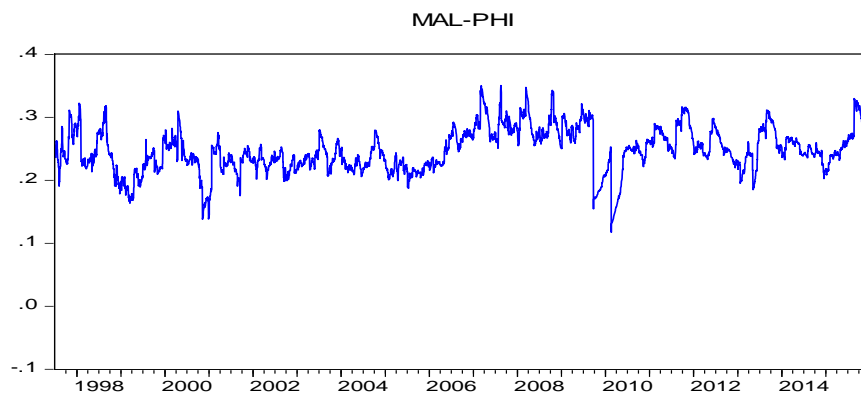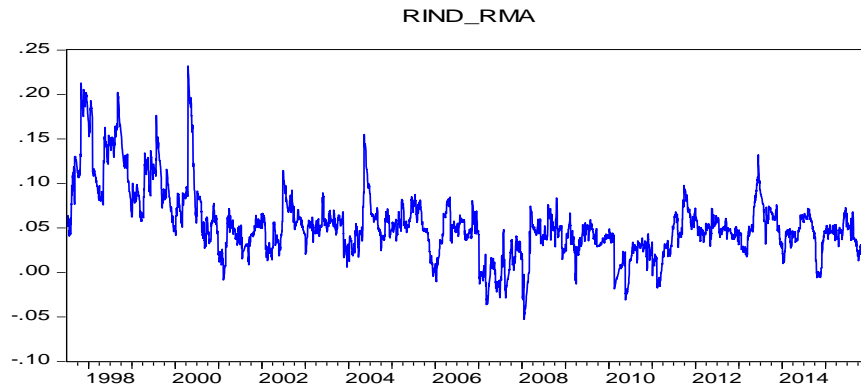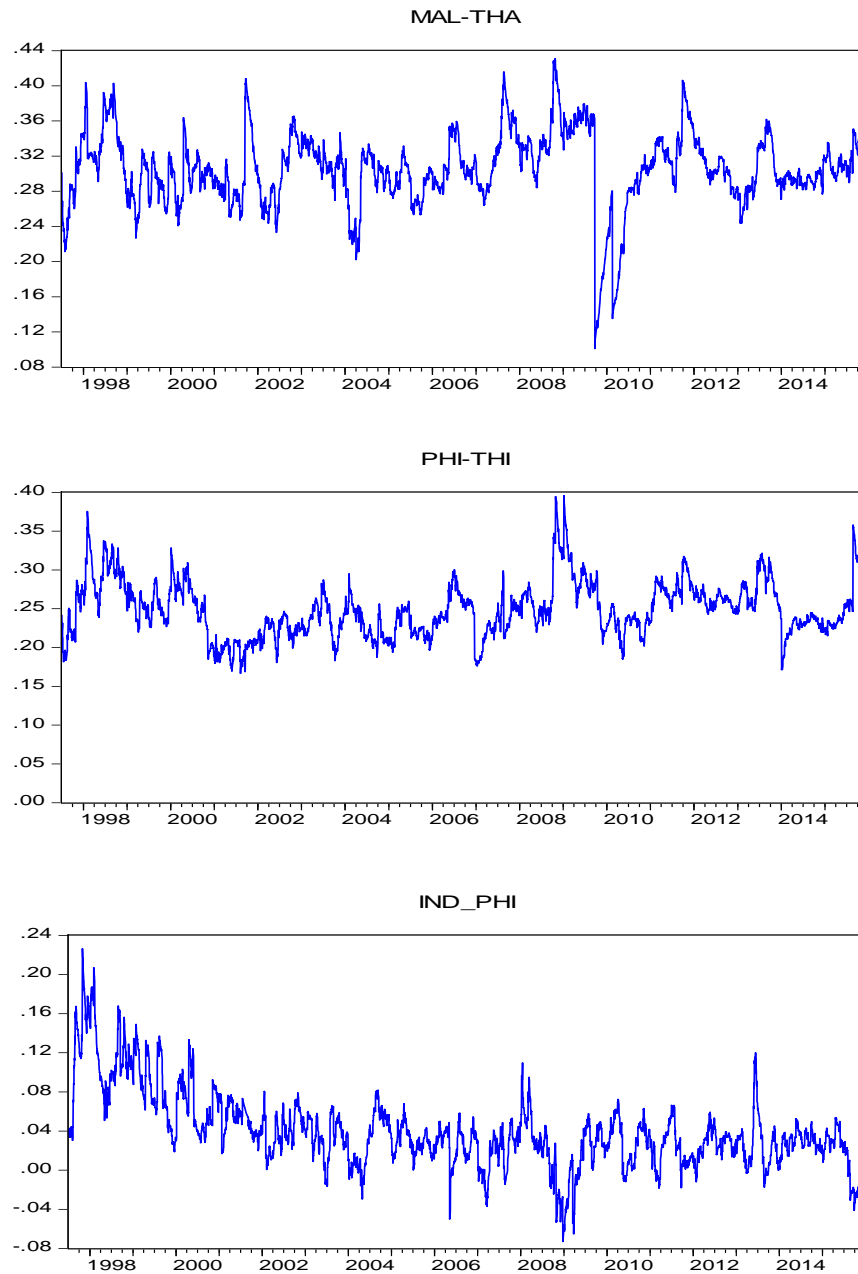
The graphical representation of 6 pair wise stock market correlations in ASEAN is indicating the trends in series. The pair wise correlations of Indonesia is indicating a negative correlation with other regional markets or considerably low positive correlation compared to the other countries in their region.

TABLE 4.4: Descriptive Statistics of pair wise DCCs of Southern Asia's markets.

	PAK-IND	PAK-SRI	PAK-CHI	IND-SRI	IND-CHI	SRI-CHI
Mean	0.102286	0.052895	0.054818	0.053553	0.135396	0.024901
Median	0.100098	0.051917	0.054175	0.053105	0.134341	0.024400
Maximum	0.261746	0.172033	0.155325	0.283921	0.273748	0.096708
Minimum	0.028843	-0.017842	-0.022110	-0.027679	0.050524	-0.062008
Std. Dev.	0.025062	0.019707	0.019057	0.021856	0.023928	0.019326
Skewness	1.007541	0.500458	0.325999	1.900256	0.375060	-0.002986
Kurtosis	6.600269	5.053139	4.009265	18.04501	4.406006	4.280629
Jarque-Bera	4791.831	1468.645	406.4062	67784.10	714.8780	461.6728

The above table represents the descriptive statistic of pair wise conditional correlations of selected stock markets in Southern Asian region. The pair wise DCCs provide a summary descriptive of all variables. The summary statistics shows the values of mean, median, mode, kurtoses, minimum, maximum, skewness, variances and Jarque-Bera. The mean values of DCCs series indicate the central tendencies. Positive and negative values shows that pair wise correlations are Skewed in both direction. Std deviation values shows high volatility of returns.. The Jarque-Berra test rejects the null hypothesis of normality. Kurtoses show the peakness and flatness of the correlation series. The value of kurtosis is higher than 3 indicating that data is leptokurtic.

4.3 Graphical Representation of Pair Wise DCCs of Southern Asia's Markets

PAK_SRI

PAK_CHI

IND_SRI

IND_CHI

SRI_CHI
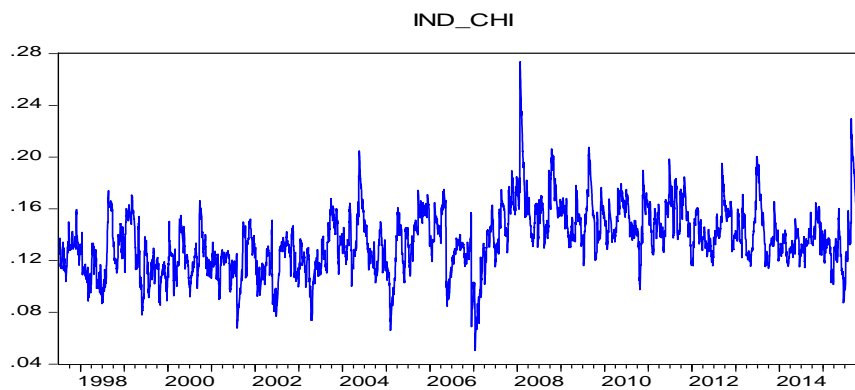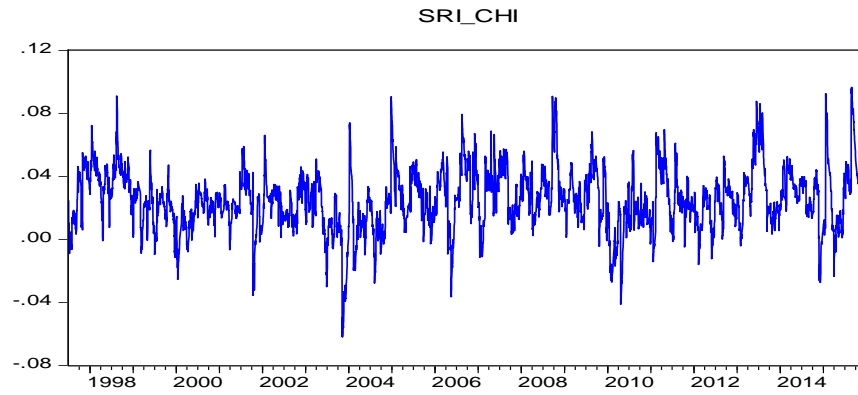
The graphical representation of 6 pair wise stock market correlations in Southern Asia is indicating the trends in series. The pair wise correlations are indicating a positive correlation with other regional markets or considerably low positive correlation compared to the other countries in their region.
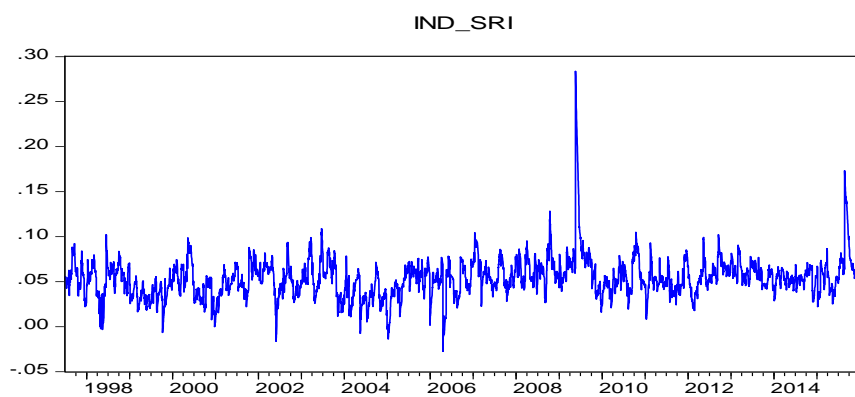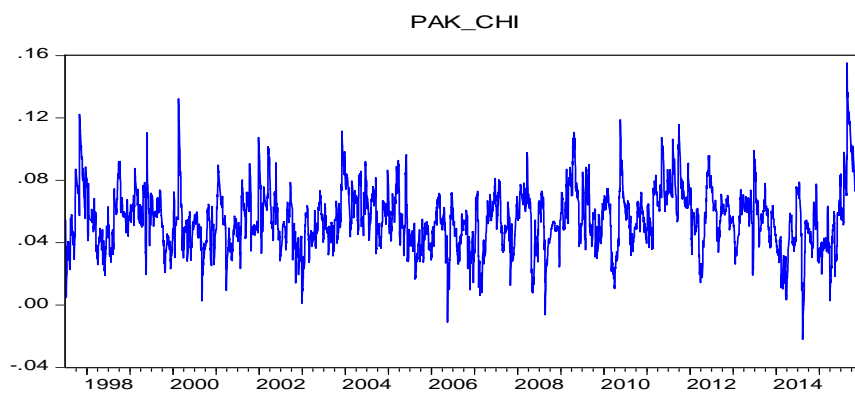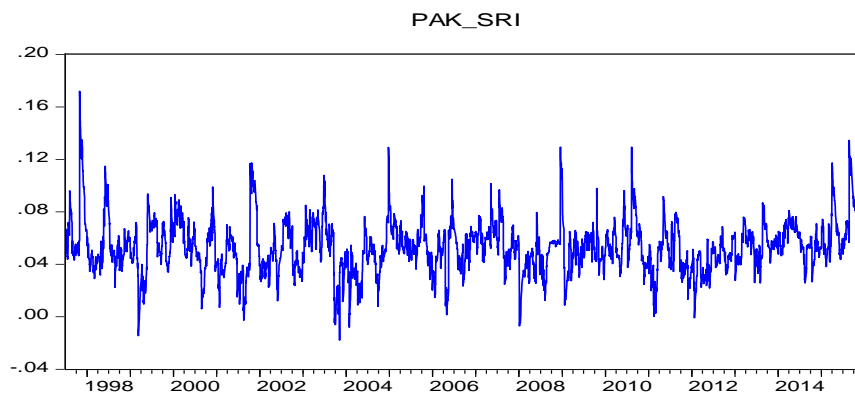
4.4 DCC-GARCH Model Estimations

TABLE 4.5: DCC-GARCH model estimation results of ASEAN markets.

	Return Equation			Variance Equation		
	γ_0	γ_1	γ_2	c	a	b
IND						
C	0.0005	0.0128	0.0588	1.6724	0.0619	0.9314
Z-sat	4.6225	8.6047	3.6319	3.8850	7.0463	108.65
Prob	0.0000	0.0000	0.0003	0.0001	0.0000	0.0000
MAL						
C	0.0001	0.0037	0.0465	1.0883	0.0862	0.9159
Z-sat	0.5352	9.8564	1.8370	2.5322	4.6352	72.287
Prob	0.5925	0.0000	0.0062	0.0113	0.0000	0.0000
PHI						
C	-0.0004	-0.1055	0.1779	3.6152	0.4920	0.5184
Z-Sat	-0.5575	-11.5242	-2.1511	1.6305	7.9122	1.9719
Prob	0.5772	0.0000	0.0315	0.1030	0.0000	0.0486

SP						
C	0.0002	0.1666	-0.0385	3.8487	0.0602	0.9395
Z-sat	2.4627	10.8602	-2.7532	3.4569	7.4465	139.55
Prob	0.0138	0.0000	0.0059	0.000	0.0000	0.0000
THA						
C	0.0005	0.1485	-0.0022	2.7021	0.0590	0.9254
Z-sat	3.4533	8.4059	-2.1544	1.5972	6.2845	83.947
Prob	0.0006	0.0000	0.0277	0.110	0.0000	0.0000

DCC-GARCH	**Coefficient**	**Z-Statistic**	**Prob.**
A	0.006596	7.736073	0.0000
B	0.978543	326.6734	0.0000

Stability condition: $\alpha + \beta < 1$ is met.

The constant term γ_0 in the mean equation shows the significance for all markets except Malaysia and Philippines. γ_1 indicates the AR(1) term. γ_1 is significant and positive for Malaysia, Indonesia, Thailand and Singapore, however it is significant and negative for Philippines. The significant results indicate that all these markets perceive autocorrelation in their stock returns. The literature shows the evidence is that due to partial adjust mentor price friction the autocorrelation is positive in emerging markets (Chaing et al, 2007).

The impact of one day lag U.S. stock returns on ASEAN markets is highly significant and greater in magnitude confirms the influential role of US stock return on ASEAN stock markets. The coefficient for Philippines is highest (0.1779) and lowest of all is for Thailand (-0.0022). Overall finding indicates that lagged US stock returns are influencing the stock returns in ASEAN markets. The variance equation specifies the highly significant coefficients for the lagged conditional volatility and shock-squared terms, the sum of ARCH and GARCH coefficients for all the models is closer to one which indicates that shocks to volatility have a persistence effect on conditional variance, Results are in consistent with the view of time-varying volatility and justifies the appropriateness of the GARCH (1,1) specification.

The estimates of the DCC-GARCH (1,1) parameters 'α' and 'β'. Results indicate both parameters are statistically significant, which reveal the substantial time-varying stock market co-movements in ASEAN. Moreover, the average sum of the coefficients of α' and 'β' being closer to one indicates that stability condition $\alpha + \beta < 1$ is met. The conditional correlations also exhibited high persistence.

TABLE 4.6: DCC-GARCH model estimation results of Southern Asia's markets.

	Return Equation			**Variance Equation**		
	γ_0	γ_1	γ_2	c	a	b
PAK						
C	8.6965	-0.0004	0.0152	2.0542	0.0835	0.9129
Z-sat	6.8317	-3.2713	2.9570	2.7307	7.8393	84.880
Prob	0.0000	0.0000	0.0385	0.0063	0.0000	0.0000
IND						
C	0.0005	-0.0251	0.0245	1.2032	0.0518	0.9424
Z-sat	4.5607	5.5392	1.7682	3.5465	6.7506	119.73
Prob	0.0000	0.0000	0.0000	0.0016	0.0000	0.0000
SRI						
C	0.0003	-0.0003	0.2469	1.7332	0.1701	0.8349
Z-sat	3.7924	-5.4407	8.6525	5.7535	5.5082	50.496
Prob	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000
CHI						
C	0.000186	-0.0032	-0.0371	1.3662	0.0421	0.9509
Z-sat	1.3697	-1.1984	-2.4628	3.1541	5.7430	111.38
Prob	0.1708	0.0427	0.0138	0.0016	0.0000	0.0000

DCC-GARCH	**Coefficient**	**Std. Error**	**Z-Statistic**	**Prob.**
α	0.004306	0.000353	2.30933	0.0000
β	0.963286	0.002195	36.04006	0.0000

Stability condition: $\alpha + \beta < 1$ is met.

The value of intercept γ_0 in the return equation is statistically significant for all markets. The AR(1) term γ_1 in the mean equation is observed significant and

negative for Pakistan, India, Sri-Lanka, and China. Results indicate that auto-correlation is observed in Southern Asia's stock market returns. The effect of γ_2 that of US stock return is significantly positive in stock returns of Pakistan, India and Sri-Lanka, γ_2 impact is significant and negative for returns of China. Results of Variance equation shows the coefficients of ARCH and GARCH term are highly significant for all the models, the sum (a + b) of ARCH and GARCH coefficient is closer to one which indicates the volatility persistence measure for all the South Asian markets examined in our data. These results lead to the appropriateness of GARCH (1,1) model specification. By using Eq. (3) estimates of the DCC-GARCH (1,1) parameters 'α' and 'β' are performed. Results indicate both parameters are statistically significant, which reveal the substantial time-varying stock market co-movements in ASEAN. Moreover, the average sum of the coefficients of 'α' and 'β' being closer to one indicates that stability condition $\alpha + \beta < 1$ is met. The conditional correlations also exhibited high persistence.

4.5 Sovereign Ratings Effects on Stock Market Co-Movements (DCCs)

TABLE 4.7: Impact of rating changes in Indonesia 'i' and Philippines 'j' on their pairwise dynamic conditional correlation 'Pij,t'.

Variables	Coefficient	Z-stat	Prob
c	0.029167	0.320420	0.03487
Pij,t-1	0.991154	600.5870	0.0000
Ii,t-1	0.022301	6.028223	0.0000***
Ii,t	-0.001111	-2.212680	0.0270**
Ii,t+1	-0.001211	-3.171775	0.0015***
Ij,t-1	-0.000171	-0.093454	0.9255
Ij,t	0.000713	0.275407	0.7830
Ij,t+1	-0.000509	-0.277674	0.7813

The estimated OLS regression result shows the impact of the long term sovereign rating announcements on the pairwise time-varying correlation coefficients of Indonesia 'i' and Philippines 'j'. The coefficient of AR(1) term for pair-wise correlation coefficient (Pij,t) is statistically significant and positive. The coefficient (0.0223) of Ii,t-1 is statistically significant and positive for one day lag period of rating changes in Indonesia, which implies that when rating changes in Indonesia, it has trigger the significant influence on pair-wise correlation coefficient Pij,t, Positive coefficients suggest that as if the credit ratings of countries 'i' upgrades (downgrade), in pre-announcement effect there is increase (decrease) in stock returns co movement.

The coefficient (-0.0011) of 'Ii,t' is statistically significant and negative at time 't' which indicates that by the day rating changes in Indonesia the pair wise correlation coefficient of stocks indices return of both countries reacted negatively. Also the coefficient (-0.0012) of 'Ii,t+1' is significantly negative which shows the effect of rating changes in country 'i' stays the same next day also, as negative pair wise correlation coefficient is observed on one-day lead. The coefficient results for rating changes in 'j' is estimated insignificant ,which implies that rating announcement in Philippines have no impact on pair-wise cross-market Correlations.

TABLE 4.8: Impact of rating changes in Indonesia 'i' and Thailand 'j' on their pairwise dynamic conditional correlation 'Pij,t'.

Variables	Coefficient	Z-stat	Prob
c	0.006990	3.710225	0.0002
Pij,t-1	0.988287	518.0232	0.0000***
Ii,t-1	0.002089	4.934911	0.0000***
Ii,t	-0.001744	-3.133211	0.0017**
Ii,t+1	-0.000257	-0.605304	0.5450
Ij,t-1	0.003870	2.051627	0.0402**
Ij,t	-0.007225	-2.714901	0.0066*
Ij,t+1	0.002848	1.509980	0.1311

The results indicates the response of time varying co movement 'Pij,t' by sovereign rating changes in Indonesia (i) and Thailand (j). The coefficient of AR(1) term of

pair wise correlation coefficient 'Pij,t' is statistically significant and positive. The coefficient (0.0020) of 'Ii,t-1' indicator variable with one-day lag period is statistically significant and positive, which implies the one day before rating changes in Indonesia it triggers the positive influence on stock markets co-movements. The coefficient (-0.0017) of indicator variable 'Ii,t' is also significant at 1% level but negative sign indicates that pair wise correlation is negatively affected by rating changes in Indonesia.

The estimated regression to check the impact of sovereign rating changes in Thailand 'j' on its neighboring country Indonesia 'i' also shows the significant spillover effect on stock co-movement. The coefficient (0.0038) of 'Ij,t-1' shows the statistically positive and significant results at level 5% with one-day lag, which confirms the pre-announcement effect of rating changes. By consider the coefficient (-0.0072) of Ij,t which is significant at the level 1%, it is found out that on rating announcement day in Thailand there seen a negative influence on the correlations of stock market 'i' with respective stock market 'j'.

TABLE 4.9: Impact of rating changes in Indonesia 'i' and Malaysia 'j' on their pairwise dynamic conditional correlation 'Pij,t'.

Variables	Coefficient	Z-stat	Prob
c	0.000104	0.089428	0.9287
Pij,t-1	0.990152	577.8036	0.0000
Ii,t-1	0.004177	10.37020	0.0000***
Ii,t	-0.004084	-7.709725	0.0000***
Ii,t+1	-0.000122	-0.302314	0.7624
Ij,t-1	-0.001607	-1.002110	0.3163
Ij,t	0.001892	0.834990	0.4038
Ij,t+1	-0.000239	-0.148906	0.8816

These results specifies the influence of sovereign rating changes in Indonesia (i) and Malaysia (j) on their time varying stock co movement 'Pij,t'. The coefficient of AR(1) term of pair wise correlation coefficient 'Pij,t' is statistically significant and positive. The coefficient (0.0041) of 'Ii,t-1' indicator variable with one-day lag period is statistical significance at 1% level and positive, which implies the one

day before rating changes in Indonesia it causes the significant changes in stock markets co-movement between Indonesia and Malaysia. The coefficient (-0.0040) of indicator variable 'Ii,t' at on rating changes day is significant at 1% level and negative sign indicates that pair wise correlation coefficient is negatively influenced by rating changes in Indonesia. The sovereign rating announcement in Malaysia 'j' causes no significant impact on the stock market correlation movement with its neighboring country Indonesia.

TABLE 4.10: Impact of rating changes in Philippines 'i' and Thailand 'j' on their pairwise dynamic conditional correlation 'Pij,t'.

Variables	Coefficient	Z-stat	Prob
c	0.003117	2.520015	0.0018
Pij,t-1	0.991006	543.2718	0.0000
Ii,t-1	0.002510	1.235947	0.0165**
Ii,t	0.005633	1.962211	0.0398**
Ii,t+1	0.003071	1.512587	0.1304
Ij,t-1	0.000990	0.526548	0.5985
Ij,t	-0.001805	-0.678801	0.4973
Ij,t+1	0.000787	0.418172	0.6758

This regression model indicates the impact of sovereign rating changes in Philippines (i) and Thailand (j) on their time varying stock co movement Pij,t. The coefficient of pair wise correlation coefficient 'Pij,t-1' is statistically significant and positive. The coefficient (0.0025) of 'Ii,t-1' indicator variable shows the statistical significance and positive with one-day lag period, which shows the one day before rating changes in country 'i' it causes the significantly positive changes in stock markets co-movement in result the correlation coefficient increases. The coefficient (0.0056) of indicator variable 'Ii,t' at time 't' shows the low positive significance at 5% levels, it indicates that pair wise correlation coefficient have positive impact by rating changes in Philippines. The coefficient of Ii,t+1 shows the insignificant result. The sovereign rating announcement in Thailand 'j' causes no significant impact on the stock market co movement with country 'i' (Philippines).

TABLE 4.11: Impact of sovereign rating changes in Malaysia 'i' and Philippines 'j' on their pairwise dynamic conditional correlation 'Pij,t'.

Variables	Coefficient	Z-stat	Prob
c	0.002010	.472917	0.1408
Pij,t-1	0.987051	439.6270	0.0000
Ii,t-1	-0.000833	-0.423941	0.6716
Ii,t	0.001117	0.401955	0.6877
Ii,t+1	-0.000142	0.072452	0.9422
Ij,t-1	-0.000266	-0.112317	0.9106
Ij,t	-0.001524	-0.454568	0.6494
Ij,t+1	0.001703	0.718234	0.4726

TABLE 4.12: Impact of rating changes in Malaysia 'i' and Thailand 'j' on their pairwise dynamic conditional correlation 'Pij,t'.

Variables	Coefficient	Z-stat	Prob
c	0.002595	2.266776	0.0234
Pij,t-1	0.990026	588.7054	0.0000
Ii,t-1	0.002417	1.358112	0.1745
Ii,t	0.000197	0.078488	0.9374
Ii,t+1	-0.002396	-1.354806	0.1755
Ij,t-1	-0.002023	-1.023480	0.3061
Ij,t	-0.000230	-0.082288	0.9344
Ij,t+1	0.002049	1.030001	0.3030

The estimated OLS regression results provide an illustration of the effect of sovereign rating changes in country 'i' Malaysia, and country 'j' Philippines and Thailand on their cross market stock co movement. The estimations shows that sovereign credit announcements in Malaysia 'i' causes no significant change in cross market correlation 'Pij,t' in both cases of rating changes in country 'j'. Neither the rating changes in Philippines and Thailand influences their correlation coefficient with Malaysia. As there are limited studies on the Malaysian rating announcements impact on stock markets, The results are consistent with Bissoondoyal-Bheenick, Brooks &

Treepongkaruna, 2014 study which assess the impact of rating changes of single country on other countries in a study sample of 10 Asian pacific countries, their results indicates no spillover impact of pre-announcement and post-announcement rating changes in Malaysia on any other country in a -5 to +5 event window.

TABLE 4.13: Impact of rating changes in India 'i' and Sri Lanka 'j' on their pairwise dynamic conditional correlation 'Pij,t'.

Variables	Coefficient	Z-stat	Prob
c	0.000998	0.558229	0.5767
Pij,t-1	0.961080	285.5989	0.0000
Ii,t-1	-0.002698	-0.784304	0.4329
Ii,t	0.012645	2.600136	0.0093***
Ii,t+1	-0.009862	-2.865917	0.0042***
Ij,t-1	-0.000699	-0.967359	0.3334
Ij,t	0.000756	0.739696	0.4595
Ij,t+1	-2.27058	-0.031467	0.9749

The estimated regression reports the response of pair wise stocks correlation coefficient 'Pij,t' of India 'i' and Sri Lanka 'j' by the sovereign rating changes in country 'i' and 'j'. As the results indicates that the coefficient of indicator variable 'Ii,t' is positive and significant at 1% level on the rating announcement day, it displays a general effect of rating announcement in India influencing the stock markets co movement 'Pij,t'. Whereas, the coefficient of post announcement indicator 'Ii,t+1' of rating changes in India effects significantly,which causes the change in correlation coefficient negatively.A positive coefficient implies that in case of rating upgrade (downgrade) cases the increase (decrease) in co movements of stock market returns on the announcement day (Gande and Parsley 2005). While rating announcement in Sri Lanka does not influences the stock markets co movement between India and Sri Lanka.

TABLE 4.14: Impact of rating changes in Pakistan 'i' and Sri Lanka 'j' on pairwise dynamic conditional correlation 'Pij,t'.

Variables	Coefficient	Z-stat	Prob
c	0.001779	6.531939	0.0000
Pij,t-1	0.964970	302.1795	0.0000
Ii,t-1	0.001692	2.632359	0.0085***
Ii,t	-0.001914	-2.106310	0.0352**
Ii,t+1	0.000234	0.363890	0.7160
Ij,t-1	0.000204	0.320033	0.7490
Ij,t	0.000520	0.577799	0.5634
Ii,t+1	-0.000723	-1.135974	0.2560

The results specifies the influence of sovereign rating changes in Pakistan (i) and Sri-Lanka (j) on time varying stock co-movement 'Pij,t' between these two countries 'i' and 'j'. The coefficient (0.990) of AR(1) term of pair wise correlation coefficient 'Pij,t' is statistically significant and positive. The coefficient (0.0041) of 'Ii,t-1' indicator variable with one-day lag period statistical significance is at 1% and positive, which implies the pre-announcement effect of sovereign rating changes in Pakistan causes the positive and significant impact in stock markets co-movement Pij,t. The coefficient (-0.0040) of indicator variable 'Ii,t' at time 't' is also shows significance at 5% levels and negative sign indicates that pair wise correlation coefficient negatively influences by rating changes in Pakistan.The sovereign rating announcement in Sri-Lanka causes no significant impact on the stock markets correlation movement.

TABLE 4.15: Impact of rating changes in China 'i' and Pakistan 'j' on their pairwise dynamic conditional correlation 'Pij,t'.

Variables	Coefficient	Z-stat	Prob
c	0.001979	3.613086	0.0003
Pij,t-1	0.962224	290.4398	0.0000
Ii,t-1	-0.001634	-0.685258	0.4932
Ii,t	0.001419	0.421164	0.6736
Ii,t+1	0.000238	0.0998519	0.9205

Variables	Coefficient	Z-stat	Prob
Ij,t-1	-3.13E-05	-0.048764	0.9611
Ij,t	6.92E-05	0.076338	0.9392
Ii,t+1	-8.22E-05	-0.128197	0.8980

TABLE 4.16: Impact of rating changes in Pakistan 'i' and India 'j' on their pairwise dynamic conditional correlation 'Pij,t'.

Variables	Coefficient	Z-stat	Prob
c	0.002573	2.913453	0.0036
Pij,t-1	0.975376	363.3627	0.0000
Ii,t-1	-0.000860	-1.252401	0.2105
Ii,t	0.001293	1.332537	0.1827
Ii,t+1	-0.000453	-0.659253	0.5098
Ij,t-1	0.001571	0.485063	0.6276
Ij,t	-0.002359	-0.515388	0.6063
Ii,t+1	0.000794	0.245256	0.8063

TABLE 4.17: Impact of rating changes in India 'i' and China 'j' on their pairwise dynamic conditional correlation 'Pij,t'.

Variables	Coefficient	Z-stat	Prob
c	0.000415	0.466348	0.6410
Pij,t-1	0.972483	342.9822	0.0000
Ii,t-1	-0.001222	-0.418111	0.6759
Ii,t	0.004483	1.084875	0.2780
Ii,t+1	-0.003027	-1.035292	0.3006
Ij,t-1	0.001097	0.476115	0.6340
Ij,t	-0.002445	-0.750158	0.4532
Ii,t+1	0.001394	0.604555	0.5455

TABLE 4.18: Impact of rating changes in Sri Lanka 'i' and China 'j' on pairwise dynamic conditional correlation 'Pij,t'.

Variables	Coefficient	Z-stat	Prob
c	0.000451	0.402191	0.6876
Pij,t-1	0.964559	300.3051	0.0000
Ii,t-1	-0.000753	-1.212037	0.2255
Ii,t	0.001871	0.319741	0.3314
Ii,t+1	-0.001101	-0.373768	0.7615
Ij,t-1	-0.001312	-0.563094	0.5734
Ij,t	0.002227	0.676067	0.4990
Ij,t+1	-0.000891	-0.382619	0.7020

To investigate the spillover effect of sovereign credit rating changes in accordance to countries closeness (geographic proximity) the study includes four Southern Asia's close boarder countries; India Pakistan Sri-Lanka and China. The estimated results of OLS regression shows that two pair wise correlation coefficient (India-Sri Lanka) and (Pakistan-Sri Lanka), are significantly affected by rating announcements in India and Pakistan. These findings are acceptable as the belongingness of countries from same geographical region is more likely to share cultural or institutional characteristics and have influential financial links to each other. The findings are consistent with prior studies which focus on particular regions to estimate credit ratings spillover on cross boarder markets (e.g., Alsakka and Gwilym, 2012; Arezki et al., 2011).

However, among the Southern Asian countries the spillover effect of sovereign credit rating announcements in China and Sri-Lanka are not found significant. The credit rating announcements prevails the asymmetric behavior,The empirical evidence supports the proposition of an asymmetric certification effect of credit rating announcement in China. Consistent with the previous studies, rating events in China suggests the weak correlation with other financial markets. Summarizes as there are some qualitative opinions that credit rating announcement in China do not have information content (Poon, and Chan 2008).

4.6   Discussion

The application of OLS regression approach is performed to study the impact of Changes in Sovereign Credit Ratings on the stock markets co-movements in the Emerging Markets of ASEAN region and four Southern Asia's closed border markets. The study findings indicate statistically significant relationship between combined valuation of ratings and outlook changes on returns co-movements in ASEAN markets, whereas a lesser impact on Southern Asia's markets.

The estimated regression coefficients 'w1' and 'w2' are expected to be either positive or negative. As Gande and Parsley (2005) highlighted sovereign rating events could causes the common or differential information spillover effects. A positive coefficient of predictor variables suggests that with rating/outlook upgrade (downgrade), it causes the stocks market co-movements to increase (decrease). Christopher, Kim and Wu (2012) elaborates this opinion that rating or outlook upgrades has a common information effect in markets and foreign investors become more confident to invest in the upgraded country as well as in other surrounding countries, which causes the increase in stock market co-movements in a region.Whilein case of a downgrade in rating/outlook the investors considers the news as specific to that country and re allocate their funds in other countries. In result, funds flow out from the downgraded country to the others, leads to decrease in their stock market correlations in region. In both cases, there is indication of a rating spillover effect. This study results provides the evidence which are consistent with studies such as; Brooks et al. (2004), Ferreira and Gama (2007), Chiang et al. (2007), and Christopher, Kim and Wu (2012).

When the estimated regression coefficient is negative it indicates that an upgrade (downgrade) in rating/outlook will decreases (increases) the co-movement in stock markets. Thus in case of rating upgrades, it signals the improved economic and investment conditions of upgraded country. Investors treat this news as specific to that country and boost funds flows to upgraded country by withdrawing from neighboring countries; as a result it decreases their stock markets co-movements in region. In contrast when the rating is downgraded, investors perceived this news as

common for whole regional markets rather than being specific to the downgraded country and as a result the capital flows out not only form the downgraded but also from neighboring markets. In effect downgrade ratings breed financial contagion effect.

This study results indicate that in ASEAN region four pair wise correlation coefficient out of six are significantly affected by S&P sovereign credit rating announcement in Indonesia, Philippines and Thailand. A significant interdependence in term of stock returns is found in pair wise stock markets correlations such as in IND-PHI, IND-THA, IND-MAL and PHI-THA. There found a strong spillover among emerging markets stock market returns by sovereign rating changes in Indonesia, as it lead to a contagion effect to Philippines, Thailand and Malaysian markets. The negative correlations suggest that investors may regard the downgrades in ASEAN markets not as specific to the country but instead they considered it as a indication of depreciated economic and investment situations in whole region which result in capital out flows from region. While positive coefficient confirms that stock market co-movement is increased when negative rating event happens. Results indicate the pre and post-announcement effect caused by credit rating changes in ASEAN. Indonesian and Thailand markets have a pre-announcement effect markets and a post announcement effect is found for Philippines.

In conclusive opinion, this empirical analysis proposes a significant impact of sovereign credit-rating changes on pair-wise cross-market correlations between the ASEAN markets around the announcement dates. The estimations are in line with previous studies which support notion that sovereign credit rating changes have a significant impact on cross country stock markets co movements; Kaminsky and Schmukler (2002); Ferreira and Gama (2007); Chiang, et al, 2007; Bissoondoyal-Bheenick (2012); Christopher et al., 2012; Böninghausen and Zabel, (2015).

The investigated results shows the spillover effect of sovereign credit rating changes in closed border countries (geographic proximity) for four markets in southern Asia; India, Pakistan, Srilanka and China. The estimations show two pair wise stock market correlation such as; IND-SRL and PAK-SRL are significantly affected

by rating announcements in India and Pakistan. The findings seems satisfactory given that countries belong from the same geographical location are more likely to share institutional or cultural characteristics in order that they have trade and economic links to each other.This result is consistent with the findings of (Ferreira and Gama 2007).

However, spillover effect of sovereign credit rating announcements in China and Sri-Lanka are not found significant. The empirical results are in consistent with earlier studies in which sovereign rating events shows the weak correlation with in different financial markets Bissoondoyal-Bheenick, (2012); Linciano (2004) & Sensoy (2016). However the estimated results in Southern Asia regions are in line with prior studies which focus on one particular regionson basis of geography to estimate credit ratings spillover on cross boarder markets (e.g., Alsakka and Gwilym, 2012; Arezki et al., 2011).

The overall findings indicate the investigation of interdependence in term of time series of stock-return correlations by sovereign rating changes, the study outcomes recommends that credit-rating agents, regionalization and geographical zones plays a dynamic roles in shaping the cross-market correlations of stock returns in the Southern Asia and ASEAN countries.

Chapter 5

Conclusion and Recommendations

5.1 Conclusion

Specifically, this study examines the response of sovereign rating changes to the movements of equity market indices in a region, showing that these effects are asymmetric in terms of dynamic interdependence of the stock markets over a relatively broad sampling period.

Sovereign credit ratings have emerge as an fundamental a part of financial regulation and to mitigate the risk associated with investments in emerging. Over the past decade, research has confirmed this perception via offering substantial empirical evidence that sovereign ratings serve to enhance the transparency of the credit risk profile of an emerging market and consequently can considerably impact its equity investment flows. However, the impact of these credit ratings on the stock markets lacks the understanding of their particular role in interdependencies between financial markets.

There are two sections in this study. Firstly to investigate the (regionalization) effect of sovereign rating changes on stock market co-movements in five ASEAN countries. Secondly to examines the existence of rating news spillover effect in closed border countries (geographical proximity) in Southern Asia's market; China,

India, Pakistan and Sri-Lanka. The study also examines the impact of positive and negative behavior of rating news in country on other markets. The study uses DCC-GARCH model to generate the series of pair wise stock market co-movements of sampling countries. The OLS regression approach is applied to investigate the reaction of changes in Sovereign credit ratings has influence on stock markets co-movements in ASEAN emerging markets and four southern Asia's closed border markets.Thisstudy also observes the behavior of rating announcements on stock co-movements with one day lag and one day lead period.

In this study, findings indicate predominantly negative rating news spillover effects of sovereign ratings and outlooks on co-movements in ASEAN stock markets. This implies that when ratings or outlook revised downward its lead to decline in returns, as the investors withdraw funds from the downgraded country as well as from the neighboring markets.In such case foreign investors observe the common stock markets behavior in a region. The negative rating coefficients are observed in Indonesia, Thailand and Philippines markets, these countries either has negative or considerably low positive pair wise stock market correlations as compared to the other countries in ASEAN.

The study evident the sovereign rating changes spillover effect in countries which share same geographic proximity for four southern Asia markets; India, Pakistan, Sri-Lanka and China. The estimations indicate that pair wise stock market co-movements in countries with close borders are significantly influenced by rating announcements in case of India and Pakistan.Results confirm the notion that closer countries in a geographical location share the common characteristics so they have effective financial and trade links to one another.The study also exhibits that stock markets are influenced before and after the rating announcement day.

As study indicates asymmetric effects on dynamic correlations, a dominant differential information spillover effects is observed which result in negative stock market correlations coefficient in both ASEAN and Southern Asia's markets. While only a significant positive correlations because of the common informational effect triggered by the rating announcements is found in Philippines.

The stock markets in ASEAN and Southern Asia are linked economically, culturally and geographically with each other. Sovereign ratings create substantial stock market interdependence in terms of rating announcements, in the context of regional level as well as geographical level. Sovereign credit ratings are considered to be one of many tools that investors may use when making decisions on equity portfolios and other instrument investments. Overall, sovereign credit rating is an indication about the creditworthiness and ability of debtor.

5.2 Recommendations and Policy Implications

- Based on this analysis it is recommended that investors and policy maker should monitor the sovereign rating changes of ASEAN and Southern Asia's economies,as stock returns of these markets have considerably influenced by rating actions.

- There are important implications for investors to manage their portfolios in studied markets, as findings specify that stock returns react heterogeneously to rating changes.

- Negative rating and outlook adjustments help to intensify portfolio diversification in emerging markets. Observed dynamic effects recommend the investors to decide while reallocating their portfolios in regional markets.

- Findings also assist to manage the shocks in stock markets caused by rating events and should be adjusted and tracked differently.

- Lastly, rating agencies can monitor traits within the rated sovereigns, so to revise in a well-timed manner to improve pro-cyclical effects of sovereign ratings in worldwide markets.

5.3 Limitation of the Study

This study is limited to regionalization impact of sovereign rating changes. It can be extended to globalization effect of rating announcements. The different financial

crises periods are ignored in study. In future large number of countries from other European and Asian region may include and also check the crises period impact. A vital direction for future research is to inspect how the European sovereign debt crisis (2011+) led rating spillover effects on asset correlations.

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