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The Relationship Between Credit Default Swaps Spreads and Credit Rating Announcements; Empirical Evidence From the Saudi Market

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By

Sara Khalid Al-Zahrani

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This thesis, written by Sara Khalid Al-Zahrani under the direction of his/her thesis supervisor and approved by his/her thesis committee, has been presented to and accepted by the Dean of Graduate Studies and Research on The Relationship Between Credit Default Swaps Spreads and Credit Rating Announcements; Empirical Evidence From the Saudi Market, in partial fulfillment of the requirements for the degree of MASTER OF SCIENCE in Management of Islamic Finance.

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ABSTRACT

A credit default swap is a contract that transfers the credit default risk of a sovereign or corporate borrower to investors. The price reflects the credit risk of the borrower. The purpose of this paper is to explore the relationship between the price spreads of credit default swaps and credit rating announcements issued by Moody's, S&P, and Fitch, to test the informational efficiency of the Saudi market through a 60-day event study of Saudi five-year sovereign credit default swaps and corporate credit default swaps for the Saudi Arabia Basic Industries Corporation. The analysis uses daily data obtained from Bloomberg for 2009 to 2015 and covers the Tawadul All Share Index and the Standard & Poor's 500 index.

This study found that there was a relationship between credit rating announcements and corporate credit default swap spreads but not between credit rating announcements and Saudi sovereign credit default swap spreads. Also, the research found that the Saudi stock market is inefficient in the weak form which is contradictory to the efficient market hypothesis. This paper will be helpful for policymakers and risk managers.

Keywords: credit default swaps, CDS, credit rating, event study, efficient market.

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CHAPTER 1 - INTRODUCTION

Rating agencies play an important role in mitigating problems stemming from asymmetric information between market participants, and in assessing the creditworthiness of corporate, sub-national, sovereign and supranational debtors. The agencies' estimates of credit risk provide an opinion on the creditworthiness of borrowing entities and their financial obligations, with no recommendation to buy, hold or sell specific instruments. The change in rating can reveal new information that may be useful to investors (Kaminsky & Schmukler, 2002).

Frequent debt crises have highlighted the importance of a correct assessment of credit risk and quick provision of the rating. For example, during the financial crisis of 2008-2009, credit ratings were accused of being inaccurate, coarse, and delayed. The credit quality of emerging markets has also declined since the onset of the 2008 economic crisis, resulting in 15 credit downgrades including the default of Ecuador in December 2008 (Ismailescu, I., & Kazemi, H., 2010). In reality, the effect of credit ratings is not fully clear. Assigning importance to rating agencies requires an assumption that rating announcements have a significant impact on financial markets. If this is true, and if credit ratings reveal new information about a particular entity, then the market for financial claims that relate to the entity's credit risk should react significantly. Stocks, bonds, and derivatives are examples of credit-risk sensitive markets. The rapidly growing credit-default swap (CDS) market is an example of derivatives.

Understanding the link between credit rating announcements and CDS prices is important, because it relates to some interesting subjects. First, if anticipation patterns could be discovered, traders could engage in profitable strategies. Second, portfolio managers could more accurately mitigate credit risk through hedging.

The credit derivatives market was a huge innovation in the first world financial markets during recent years. Its growth exceeded all expectations, and many anticipate that it will continue to grow. Since 1996, credit derivatives market has experienced a phenomenal growth، this is partly explained by heightened interest in credit risk, among financial institutions, hedge funds, insurance companies, due to deteriorating corporate credit qualities after the burst of dotcom bubble (Zhang, 2014). The credit derivatives market in emerging economies has also grown rapidly since beginning in 1996.

One of the most popular credit derivative instruments is the credit default swap (CDS). A CDS is a contract between two parties which provides insurance for the holder against losses caused by default on a bond (reference obligation) issued by a reference entity (borrower). It transfers the credit default risk of the reference entity (sovereign or corporate) to investors.

The market for CDS spreads is continually updated with the latest credit-related information. Consequently, whether a CDS can become an important credit risk reference becomes an interesting issue. The question may arise: how do corporate or sovereign CDS spreads respond to credit rating announcements? If the markets reveal different responses to rating announcements, traders could take arbitrage opportunities from the differences in prices. CDS spreads must not change in reaction to credit rating announcements, and in an efficient market, should reflect all available information, assuming that rating agencies rely on publicly available information to form their opinions.

This study will try to answer the question ‘do credit rating announcements provide new information to the Saudi market, and is there any relationship between CDS spreads and credit rating announcements?

Previous researchers have investigated the link between credit rating announcements and bond and equity markets, but the majority of these studies focused on the US markets. Recently, CDS markets allowed researchers to access CDS contract data, making more detailed analysis of CDSs possible.

The contribution of this thesis is the first research on the link between credit rating announcements and Saudi CDS spreads. The objective of this study is to explore the relationship between CDS spreads and credit rating announcements made by the three largest credit rating agencies: Moody's, Standard and Poor's (S&P), and Fitch Ratings, to test the informational efficiency. This will be performed through an event study to observe whether and how stock and CDS markets reacted to credit rating announcements (CRAs) during the years 2009–2015. CRAs were collected via Bloomberg.

This thesis starts with a review of related literature, and a brief discussion about CDS contracts, credit rating events, and CDS spreads. Then, in Chapter 2, the credit rating process and the credit rating industry are described. In Chapter 3, the applied methodology and descriptive statistics for the study data are presented. Chapter 4 presents the empirical findings and analysis. The conclusions are stated in Chapter 5.

CHAPTER 2 – LITERATURE REVIEW

This research focuses on the response of the credit default swap (CDS) market to credit rating announcements.

The CDS market includes two sectors: corporate and sovereign. Corporate CDSs allow the transfer and management of credit risks of underlying corporate entities. Sovereign CDSs offer protection against the default of a referenced sovereign government

Made and Olszanowski (2007) proved that understanding the link between credit rating announcements and CDS prices is important because it relates to several interesting topics. First, if anticipation patterns could be discovered, traders could engage in profitable strategies. Second, portfolio managers could mitigate certain credit risks through hedging.

On other hand, Remolona, Scatigna and Wu (2007) showed that, as the sovereign CDS market enables the exchange of sovereign risk between participating financial institutions, markets compile quotes from a large sample of financial institutions and aggregate them into a composite spread that is reasonably continuous.

There are a great number of studies that have previously analyzed the market response to credit rating announcements. In much of the literature on CDS and credit ratings, the relationship between CDS spreads and credit ratings announcements behaves as intuition would predict: the better the announced rating, the lower the expected CDS spread.

2.1 Corporate CDS and credit ratings

2.1.1 International corporate CDS

Daniels and Jensen (2004) empirically examined the relationship between credit spreads (CS) and CDS spreads, and how the spreads reacted to changes in credit ratings. They performed an event study for the years 2000 through 2002, and covered five-year CDS quotes for 72 corporations. They found that the CDS spread and the credit spreads were related, but not equal. They also studied how the price of corporate bonds and CDS contracts issued by the same reference entity responded to changes in credit rating. They found that a change in credit rating had a large effect on the credit spread and CDS spread around the time of a downgrade in credit rating. Particularly, the CDS market responded significantly to changes in credit ratings for low-rated companies.

Made and Olszamowski (2007) hypothesized that the market does not expect new information and therefore reacts upon its release. They also found CDS movements following all rating announcements except downgrading to be statistically significant. However, among the three rating agencies, announcements made by S&P and Moody's were more often statistically significant, in four out of five categories, than announcements from Fitch. This contradicts the hypothesis that announcements from different rating agencies would have a similar impact on CDS spreads. The volatility of the market also differed around the dates of negative and positive announcements.

Kapoor, Sachdeva and Gupta (2013) studied the relationship between security returns for 12 banks listed on the Bombay Stock Exchange and credit rating announcements by the Information and Credit Rating Agency (ICRA)[1] for the period from 2001 to 2012. The study used an event window of 20 days [-10, 10]. They found that credit rating announcements affected stock returns, and that the effects of an upgrade on credit ratings were less than on downgrades. In the case of upgraded credit ratings, the banks with the higher market share showed more positive returns than those with a lower market share, and vice versa in the case of a downgrade. This supports the hypothesis that the credit rating does affect the return on securities and that rating announcements bring new information to the market. The authors proved that the relationship between credit rating and security return varies from market to market, from company to company, and by credit rating agency.

[1] ICRA is an Indian independent and professional investment information and credit rating agency.

2.1.2 GCC corporate CDS

Burghof, Schneider and Wengner (2012) examined the influence of credit rating announcements from the same big three credit rating agencies (Moody's, S&P and Fitch) on corporate CDS spreads and the spillover effect within industries. They found that both downgrades and upgrades had an impact on the CDS spreads and lead to spillover effects around the event date. The degree of the reaction depended on the industry, as well as on the credit rating agency.

2.2 Sovereign CDS and credit rating

2.2.1 International sovereign CDS

Blau and Roseman (2011) discussed CDS spreads for European countries surrounding August 5, 2011 when Standard and Poor's downgraded the U.S. government's credit rating. The study observed European CDS spreads in three event windows where day t was the U.S. downgrade day:

- pre-downgrade period [t-5, t-1].
- downgrade period [-1, +1]
- post- downgrade period [t +1, t +5].

The authors found an increase in European CDS spreads through the ten-day period surrounding the U.S. downgrade while American CDS spreads did not increase. Also, they found that the largest increase in CDS spreads were in European countries with the smallest GDP per capita, and in countries that had not recently been downgraded.

2.2.2 Emerging sovereign CDS

Remolona, Scatigna and Wu (2007), found that country-specific factors are the main drivers of sovereign risk while a global risk aversion by investors is the dominant determinant of the true sovereign risk premium. The set of country-specific variables are inflation, industrial production, GDP growth, consensus forecasts, and foreign exchange reserves. The authors also found that the sovereign risk premium is highly correlated than sovereign risk itself within emerging market regions. The sample they used covered 24 small and/or emerging markets in Latin America, Central and Eastern Europe, Asia, the Middle East and Africa, from January 2002 to May 2006.

Ismailescu and Kazemi (2010), studied the reaction of sovereign CDS markets to a decline or improvement in the creditworthiness of an emerging economy, using daily observations from January 2, 2001 to April 22, 2009. They found proof of an asymmetric reaction of CDS markets to credit rating events. Negative rating announcements had no impact, while positive rating announcements immediately altered sovereign CDS markets. This finding suggested that a credit upgrade carries more information than a credit downgrade in emerging economies.

2.2.3 GCC sovereign CDS

Atrissi and Akoum (2012), examined the factors relating to CDSs in the context of Arab countries during the revolutions of 2010 and 2011, particularly the impact of the Arab Spring on several elements of sovereign CDS spreads. The daily data from June 1, 2009 to July 31, 2011 included five-year CDS spreads for Tunisia, Egypt, Bahrain, Lebanon, Saudi Arabia, Qatar and the United Arab Emirates. Some of the factors the authors considered to be determinants of sovereign CDS spread were public debt, GDP growth rate, budget deficit (or surplus), credit rating, inflation, unemployment, the exchange rate, and the numbers of demonstrators and victims. Their findings supported the prediction that the variables of public debt, budget deficits, GDP growth, exchange rates and credit ratings on our dependent variable: sovereign CDS spreads. The exchange rate strongly correlated with the levels of public debt and credit rating. They found that the number of demonstrators and the number of victims had a strong relationship with the CDS premium. The more the number of demonstrators and victims increased, the more the national risk increased, directly affecting sovereign CDS spreads.

As this research mentioned, previous studies showed that corporate CDS and credit ratings are closely related, and rating announcements bring new information to the market. And, positive rating announcements have an impact on sovereign CDS markets and bring new information to the market. Moreover, specific country factors affect the CDS market.

There have been very few studies in this field that covered all countries, especially in the Gulf Cooperation Council states, because of the lack of CDS data. This thesis tried to overcome this lack of research in international and GCC countries, and to extend the literature to fill the gap in the Saudi market.

2.3. Credit Default Swap

Credit derivatives were a huge innovation in the financial market during recent years. The growth of the credit derivatives market has exceeded all expectation and is expected to continue. There are different types of credit derivative instruments; one of the most popular instruments is the credit default swap (CDS). The first CDS contract was advanced in the late 1990s, and in 1999 the International Swaps and Derivatives Association (IDSA) issued the definitions of credit derivatives.

2.3.1 Credit default swap

A credit default swap (CDS) is an over-the-counter derivative contract between two parties which provides insurance for the holder against losses caused by the event of default on a bond (reference obligation) issued by the reference entity, so it is a contract that transfers the capability of the credit default risk of a reference entity (sovereign or corporate) borrower to investors. It gives an opportunity to transfer credit risk without transferring the underlying credit asset. The advantages of the CDS as a derivative instrument are to support trading the risk of any obligations of a company without dealing with these obligations, and to have the ability to diversify a portfolio risk without diversifying the portfolio itself. The price of CDSs (or the CDS ‘spread’) is a periodic premium and reflects the credit risk of the underlying company. Hull et al. (2004) showed that CDS spreads should be closely related to bond yield spreads that are good indicators of credit risk. For speculation purposes, the CDS market attracts all kinds of financial investors. A CDS buyer protects himself against the loss of payments due to a credit event in the underlying asset. Though the CDS buyer lends money to a company, the CDS provides insurance, so he/she does not have to be concerned about getting back his/her money. The CDS seller is the party that insures the payment (the insurer). For this protection, the buyer makes a regular stream of payments to the insurer, usually quarterly, known as a periodic premium, quoted as basis points (bps) per annum of the principle amount of the contract (the insured amount), until the contract matures or a credit event occurs, whichever comes first.

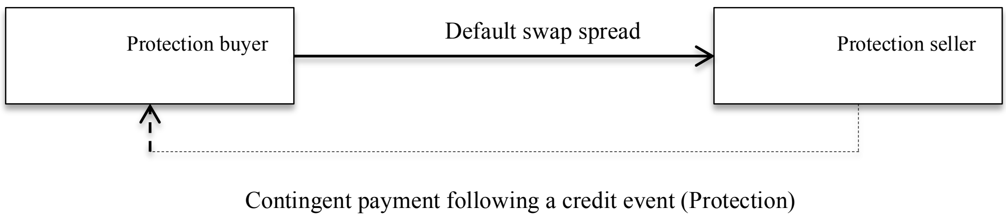

Figure 1: Illustration of the CDS structure

Source: Made and Olszamowski (2007)

Figure 1 illustrates the process of premium and protection. If default happens between premium payments, the protection buyer should pay to the protection seller the amount of the premium that has accrued since the most recent CDS premium payment. A standard CDS contract does not include exchange of cash and has a zero market value. Therefore, the annuity premium for the market value of the CDS is zero. This premium, which is usually quoted in bps per $100 par value of the reference obligation (the bond), is called credit default swap spread.

2.3.2 The maturity of the CDS

The maturity of a CDS contract does not necessarily fall on the same date as the maturity of the reference entity. Maturity can range from two months up to ten years or more. Most CDSs are quoted for a benchmark time-to-maturity of five years, and these are considered to be the most liquid.

2.3.3 The credit event of the CDS

In a standard CDS contract, the definition of credit event always includes bankruptcy, failure to pay, obligation default, repudiation and restructuring. A credit event is what a buyer of a CDS protects himself against.

The following situations are also considered to be insurable debt obligations, as defined by ISDA (2003):

1. A reduction in the interest rate on the obligation
2. A reduction of the principal or premium
3. An extension of the maturity of the obligation
4. A change in the priority ranking of payments
5. A change in the currency or composition of the payment of principal or interest.

If any of these five restructurings of a bond occurs, a protection buyer or seller can claim an default event.

When the reference entity cannot meet its obligations, that is a credit event. When a credit event occurs, a CDS can be terminated by what is known as ‘physical settlement’. The protection buyer delivers the reference obligation to the protection seller, and in response the seller pays the full value of the reference obligation to the buyer. Once the participants have settled, the contract is terminated.

The contract can also be settled with a cash payment, depending on the agreements contained in the contract. In the case of cash, the protection seller pays to the protection buyer either the difference between the notional and the market value of the credit asset, or a predetermined fraction of the notional amount. Daniels and Malene (2004) wrote that the CDS spread should be approximately equal to the ratio of the credit spread over the risk-free rate.

2.3.4 The usage of CDS

CDSs are used to:

1. Hedge and/or diversify credit exposure. CDSs are used to manage the default risk that appears from holding debt.
2. Speculate on credit exposure. CDSs allow investors to speculate on changes in CDS spreads. The investor could speculate on the credit quality of an entity. The CDS spread will increase as creditworthiness decreases, and decrease as creditworthiness increases. Then, the investor could buy CDS protection in a company to speculate against a default. Otherwise, the investor could sell the protection if it thinks that the creditworthiness of a company might improve.
3. Synthetically create loan or bond substitutes for entities that have not issued in those markets, to better fulfill the needs of the risk taker and those who are risk averse. CDSs can be used to design new financial instruments.
4. Decompose and separate risks embedded in securities. CDSs allow participants to take advantage of arbitrage opportunities in the bond market.
5. Manage regulatory capital ratios.

Therefore, through trading, the CDS market becomes more liquid, improving the chances that buyers and sellers of protection will find a contract partner, and improving pricing efficiency. On the other hand, excessive trading may harm the pricing mechanism by forcing borrowers to pay excessively high rates on their debt.

2.4 Credit Rating

Rating agencies play an important role in mitigating problems stemming from asymmetric information between market participants and in assessing the creditworthiness of corporate, sub-national, sovereign and supranational debtors. Credit rating agencies have grown during recent years because they have an important impact on the market and provide services to market participants. Credit ratings help investors to understand the risks associated with investing in the reference obligation. Financial institutions, bondholders and other investors use credit ratings when making decisions in their investment portfolios or recommendations to buy, hold or sell specific entities. Credit ratings are used to measure the credit quality of a specific debt issuing entity, and reflect a relative ranking of credit risk. Today, there are three major agencies that provide credit rating information: Moody's Investors Service (Moody's), Standard and Poor's-a Division of the McGraw-Hill Companies Inc. (S&P), and Fitch Ratings Inc. (Fitch).

Investors use credit ratings to measure the level of risk and compare the offer with his/her expected return, to enhance his/her risk-return trade-off. It helps the issuers of the debt instrument to price their issues perfectly and to reach out to new investors.

2.4.1 Classification of credit rating grades in different agencies.

Definitions and symbols of credit rating differ amongst the agencies. Some credit rating agencies distinguish between the definitions of investment and non-investment grade ratings. A rating that is higher than BBB- is investment-grade, and a rating that is BBB- or lower is a non-investment grade. For example, bonds rated by Moody's as Aaa, and by S&P as AAA, are considered to have nearly no risk of default in the future, whereas credit ratings below Baa3 and BBB- respectively are referred to as under-investment grade or non-investment grade. A change of credit rating can happen at any time, without notice, and at any rating level. AAA credit ratings on a debt instrument do not indicate with absolute confidence that the investor will always be paid. The table below describes the classification of credit rating grades in different agencies.

Table 1. Credit Ratings

	Moody's	S&P	Fitch
Highest	Aaa	AAA	AAA
Very high	Aa1, Aa2, Aa3	AA+, AA, AA-	AA+, AA, AA-
High grade	A1, A2, A3	A+, A, A-	A+, A, A-
Good	Baa1, Baa2, Baa3, Baa4	BBB+, BBB, BBB-	BBB+, BBB, BBB-
Speculative	Ba1, Ba2, Ba3	BB+, BB, BB-	BB+, BB, BB-
Very speculative	B1, B2, B3	B+, B, B-	B+, B, B-
Substantial risks or in default	Ca, Caa1, Caa2, Caa3	CCC+, CCC, CCC-, CC, C, D	CCC, CC, C, RD, D

2.4.2 Announcement of credit rating

When rating agencies announce changes in credit rating, they refer entirely to a corporation. A credit rating is considered as a description of the creditworthiness of the bond issuer. The aim of investagating the announcement is to find the impact of the credit rating on the return securities or bonds, and to realize the impact on a company when it is rated by more than one rating agency, and the effect on the return and investors.

The impact of the announcements depends on the credit rating agency making the announcement as well as on the industry that is affected. The average reaction of a company that is affected by a rating change does not reveal how much of the information is firm-specific and how much is industry-wide.

2.4.3 The credit rating process

The credit rating process involves both the credit rating agency and the issuing company as shown below.

Figure 2: Credit rating process

Source: Made and Olszamowski (2007)

1. A formal credit rating is requested by the security issuing company.
2. The rating agency selects a team of analysts with the appropriate expertise.
3. The members of the analytical team meet with the management of the security issuing company to review all the elements that could affect the rating.
4. The rating agency convenes a committee to discuss the lead forecaster's rating recommendation and the supporting data.
5. The committee votes to reach the final rating and the security issuer is notified of the result.
6. The issuer can appeal the rating before it is made public. Once the rating has been assigned and made public, it is monitored in order to guarantee its legitimacy.
7. Credit rating agencies usually meet annually with the management of the security issuing company, even if there are no new issues, to stay current with developments at the company.

Credit ratings are an important source of information on credit quality. Moreover, credit ratings influence interest rates, variance of the company stock price, and leverage of the company. They are also main factors in a company's CDS spreads.

CHAPTER 3 - METHODOLOGY

The scope of this study is to observe the relationship between CDSs and credit rating announcements in the Saudi market, and to analyze the market's reaction around the announcement date by using standard event-study methodology as proposed by Brown and Warner (1980, 1985), and to provide the features of our data.

3.1. Data

In this research, the CDS spreads used as primary data were obtained from Bloomberg, as daily observations of the spreads of CDS contracts with a maturity of five years. The Saudi Arabia Basic Industries Corporation (SABIC) was chosen for observation because it was the only company with CDS spreads in the Saudi market. The study covers the time period from January 2009 to April 2015. The focus is on announcements from the three major credit agencies, Moody's, S&P and Fitch.

3.1.1. Tadawul All Share Saudi Market

The Saudi Arabian stock exchange, the Tadawul All Share Saudi Market (TASI) began in the mid-1930s, when the Arab Automobile Company was established as the first joint stock company in the Kingdom of Saudi Arabia. By the 1970s, there were 14 public companies trading on TASI, and a number of large corporations and joint stock banks had been established. The government began creating a regulated market for trading together with the required banking systems. When the government noticed the economy of the KSA had grown, the Ministry of Commerce and the Saudi Arabian Monetary Agency (SAMA) were created to regulate and develop the market, to protect investors, and to ensure justice and efficiency in the market. The average daily prices and returns of Saudi sovereign equity (SEQT) and sovereign credit default swaps (SCDSs) are shown in the appendices.

3.1.2. SABIC

Ranked among the world's largest petrochemicals manufacturers, SABIC is a public company based in Riyadh, Saudi Arabia. SABIC began in 1976 by royal decree, and its growth has been exponential. Today, the company has operations in more than 40 countries with a workforce of more than 40,000 individuals. 70% of the company's shares are owned by the Saudi Arabian government, with the remaining 30% held by private investors in Saudi Arabia and other countries of the Gulf Cooperation Council. The average daily prices and returns of SABIC's company equity (CEQT) and company credit default swaps (CCDS) are shown in the appendices.

Table 2. Result from the data descriptive

	SEQT	CEQT	SCDS	CCDS	SP500
N	1245	1245	1245	1245	1245
Mean	0.0	0.0	0.0	0.0	0.0
SD	0.01	0.02	0.03	0.02	0.01
Minimum	-0.09	-0.16	-0.20	-0.15	-0.07
Maximum	0.09	0.10	0.36	0.16	0.05
Skewness	-1.06	-0.25	1.11	-0.02	-0.40
Kurtosis	12.37	9.85	17.91	17.64	4.50
Jarque-Bera*	8199.4151***	5071.961***	16964.6308***	16200.2303***	1089.103***

Significance codes: *** at 1%, ** at 5%, * at 10%

The basic statistical values of the variables are shown in Table 2. The value of standard deviation indicates a stability of daily stock and CDS returns. The minimum value is SCDS of -0.20 and the maximum value is SCDS of 0.36. Skewness describes the asymmetry from the normal distribution in a set of statistical values. The measures of skewness suggest that the variables are not distributed symmetrically. From Table 1, it is clear that SEQT , CEQT, CCDS and SP500 were negatively skewed while SCDS skewed positively. The kurtosis shows that all the selected series are less peaked than normal distribution. Since the kurtosis statistic is positive, the series follow leptokurtic distribution. Results obtained from a Jarque-Bera test confirm that none of the series are normally distributed. In the Jarque-Bera test, values were rejected at a 1% level of significance.

Table 3. Correlation results

Correlation	SEQT	CEQT	SCDS	CCDS	SP500
SEQT	1	0.68	-0.57	-0.82	0.91
CEQT	0.68	1	-0.47	-0.50	0.51
SCDS	-0.57	-0.47	1	0.55	-0.56
CCDS	-0.82	-0.50	0.55	1	-0.88
SP500	0.91	0.51	-0.56	-0.88	1

A correlation is a measure of a linear relationship between two or more normally distributed interval variables. The range of the correlation coefficients is from -1.00 to +1.00. The value of -1.00 represents a perfect negative correlation while a value of +1.00 represents a perfect positive correlation. A value of 0.0 represents no correlation. In the research data, the highest correlation between the SP500 and SEQT is 0.91.

3.2. Model

This research used event study methodology to measure the relationship between CDS spreads and credit rating announcements, and to measure the impact of an unexpected information event on corporate and sovereign stock price and CDS spreads.

The advantages of event studies are to:

1. test the null hypothesis that the market efficiency includes information.
2. assess the impact of an event on the wealth of the security firm holders.
3. examine the impact of an event on the stock price of the company.

Event study methodology is widely used in investigating the impact of accounting rule changes, earnings announcements, changes in the severity of regulation, stock splits, merger or takeover announcements, money supply announcements and any event that may create a relatively large change in the price of the asset over some period.

In general, an event study looks at the impact of a particular event on the value of assets, relative to standard deviation of typical change. The event study analyses the variations in stock price beyond expectation (abnormal returns) over a period of time (event window). This study attributed the abnormal returns to the effects of the event. The stock's abnormal return (the difference between the expected returns based on general market movement and the actual returns) provides an unbiased estimate of the economic worth of the event (Brown and Warner, 1980). The assumption of the event study methodology is that the market must be efficient. The effects of the event will be reflected immediately in the stock prices of the company, given an efficient market. This will allow the researcher over a short period to observe the economic effect of the event.

The efficient market hypothesis asserts that a stock price reflects all public information about the firm, so only unexpected information can change the price of a stock (Fama et al., 1969). The way to calculate the expected return of a security is to use a market model that assumes a linear relationship between the expected return of a share price of a company and the stock market index. The market model depends on conditions called systematic risk that are unique to the firm.

To analyze the event data, this research followed these steps with Excel software:

1. Identify the specific event date.
2. Identify the event window.
3. Estimate the parameters using the data in the estimation window. Calculate the two parameter estimates, alpha and beta, by applying the return-generating model to the data from the estimation period.
   - beta is the slope coefficient of the regression line and stands for the systematic risk.

$$\boldsymbol{\beta} = \frac{\sum_{i=1}^{n}(\boldsymbol{R_{mi}} - \overline{\boldsymbol{R}}_{\boldsymbol{m}})(\boldsymbol{R_{si}} - \overline{\boldsymbol{R}}_{\boldsymbol{s}})}{\sum_{i=1}^{n}(\boldsymbol{R_{mi}} - \overline{\boldsymbol{R}}_{\boldsymbol{m}})^{2}}$$

Equation 1. Slope coefficient of the regression line

   - alpha is the intercept of the regression line and stands for the risk-free rate.

$$\boldsymbol{\alpha} = \overline{\boldsymbol{R_s}} - \boldsymbol{\beta}\overline{\boldsymbol{R_m}}$$

Equation 2. Alpha intercept of the regression line

4. Measure the abnormal returns in the event window, in which the daily expected return of individual share prices could be obtained by compensation the parameter estimations to event period.

$$\boldsymbol{E(R_s)} = \boldsymbol{\alpha} + \boldsymbol{\beta R_m}$$

Equation 3. Replacing parameter estimations

   - Daily expected return on individual share price can be determined by replacing the alpha and beta from the estimation period here. Then the daily abnormal return in the test period can be calculated by applying the following equation.

$$AR_s = R_s - E(R_s)$$

Equation 4. Daily abnormal return

5. Aggregate abnormal returns, the cumulative abnormal return and average abnormal return can be calculated based on the daily abnormal return in the test period. Then, see whether this event has a positive or negative influence on the company.
    - Estimate the average abnormal return during month $_s$ (AAR):

$$AAR = \sum_{i=1}^{N_z} \frac{AR_{is}}{N_s}$$

Equation 5. Average abnormal return

$$AR_{is} = the\ estimator\ of\ the\ abnormal\ return\ for\ stock\ i$$

$$N_s = the\ number\ of\ firms\ in\ the\ sample\ during\ month\ s$$

- Estimate the cumulative average abnormal return ($CAAR_{S1,S2}$):

$$CAAR_{S1,S2} = \sum_{s=S1}^{S_2} AAR_s$$

Equation 6. Cumulative average abnormal return

6. Test the significance of the required results.

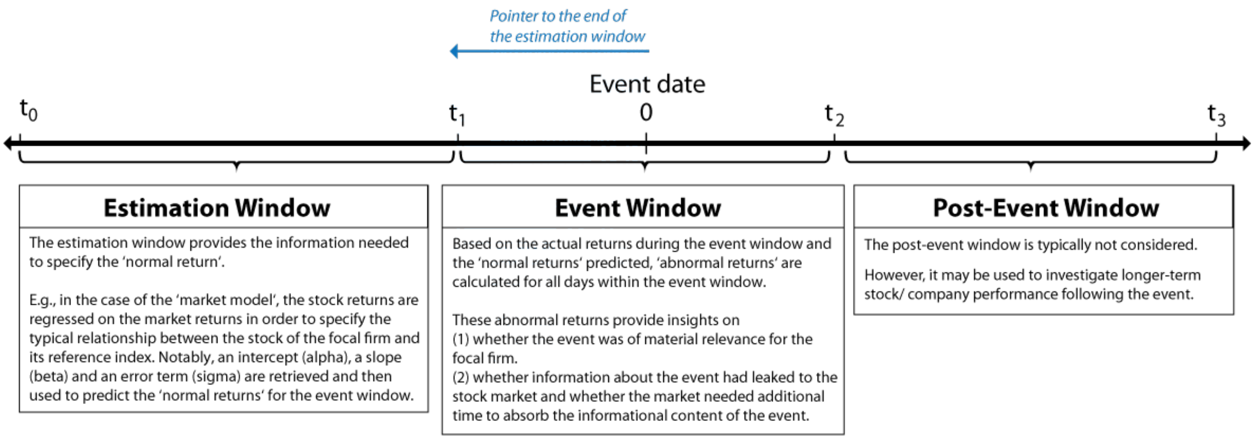

Figure 3: Event Study Methodology

1. $[T_0...T_1]$ is estimation window
2. $[T_1...T_2]$ is event window
3. $[T_2...T_3]$ is post-event window

This study defined an event as a change in credit rating, and the event date as the day when a change in credit rating happened. The event window is the time period over which the study measured the effect of the event on the CDS spread. The event window included the event day and the days before and after the event.

The estimation window is a period during which parameters were estimated. The day of the credit rating announcement is denoted as the event date t=0, and the event window consists of 60 business days ranging from 30 days prior to the event date and 30 days after the event date. Therefore the event window is written as [-30, 30]. Table 4 shows the rating event dates that were used in the study.

Table 4. Event windows

Agency	Corporate	Sovereign
Moody's	-30, February15, 2010, +30	-30, February 15, 2010, +30
S&P	-30, February 09, 2015, +30	-30, February 09, 2015, +30 -30, January 07, 2014, +30 -30, May 29, 2013, +30
Fitch	-30, October 29, 2014, +30 -30, August 28, 2014, +30 -30, June 29, 2012, +30	-30, February 26, 2015, +30 -30, March 07, 2014, +30

3.3 The efficient market hypothesis

The efficient market hypothesis suggests that all available information about the value of a firm (including expected future cash flow, which incorporates factors such as volatility, liquidity, and risk of bankruptcy) is already completely reflected in the current stock price, and that nobody can generate profits by using available public and private information. To assess whether the market is an efficient, if the prices change quickly and without bias to all known information available to the investors. Many investors attempt to find securities that are likely to increase in value in the future and to increase more than others. The main factor behind change in price is the arrival of new information; the constant arrival of information makes prices fluctuate.

3.1 Kinds of Efficient Market Hypotheses

1. Weak Efficiency

The current security prices fully reflect the most public and the most easily available information (past prices).

2. Semi-strong Efficiency

The existing security prices reflect all publicly available information, not only past prices, but also earnings and dividend announcements, and the financial situation of the company’s competitors as reported in financial statements, expectations regarding macroeconomic factors, announced merger plans, etc. The market is efficient if all public and past price information is reflected in the stock price, and one should not be able to profit by using this information.

3. Strong Efficiency

The current price fully reflects all offered information, whether past, public or private. Nobody can earn excess profits even if trading on not-publicly known information at the time.

CHAPTER 4 – ANALYSIS AND DISCUSSION

In this chapter, the research is first illustrated in graphic analysis, then the results from the event study are presented. The results from the event study are related to the average credit spread between rating classes, and the volatility around the announcement dates is examined. In the graphs of Saudi sovereign and SABIC corporate equity (please see the appendices), the thesis observes a reaction in the expected and the abnormal return direction around the announcement day. Looking at the abnormal return and comparing the expected return after the event date, the researcher observed an increase in the spread level on many of the days of the window, but not immediately around the announcement day. This result was converse in the case of downgrade. Yet in stable rating the returns are volatile. It is interesting to note that the magnitude of the changes differs considerably between upgrade, downgrade and stable.

After calculating the cumulative abnormal return for all windows, one should analyze whether there was a statistical change in the returns of CDS spreads. Rating agencies often review their rating assessment in response to new information, both private and public. The new information could be new debt and equity issues, capital restriction, internal reports, or forecasts and earning announcements. Rating agencies will attract attention and initiate a market reaction if there is any information that indicates a possible change in a company's future.

This chapter will first analyze the performance of sovereign and corporate Saudi markets, then measure the efficiency of the Saudi market.

4.1. Saudi sovereign and corporate performance analysis

4.1.1 Corporate cumulative average abnormal returns analysis

Table 5. Dates of SABIC credit rating announcements

	Event 1	**Event 2**	**Event 3**	**Event 4**	**Event 5**
Moody's					February 15, 2010
S&P	February 09, 2015				
Fitch		October 29, 2014	August 28, 2014	June 29, 2012	

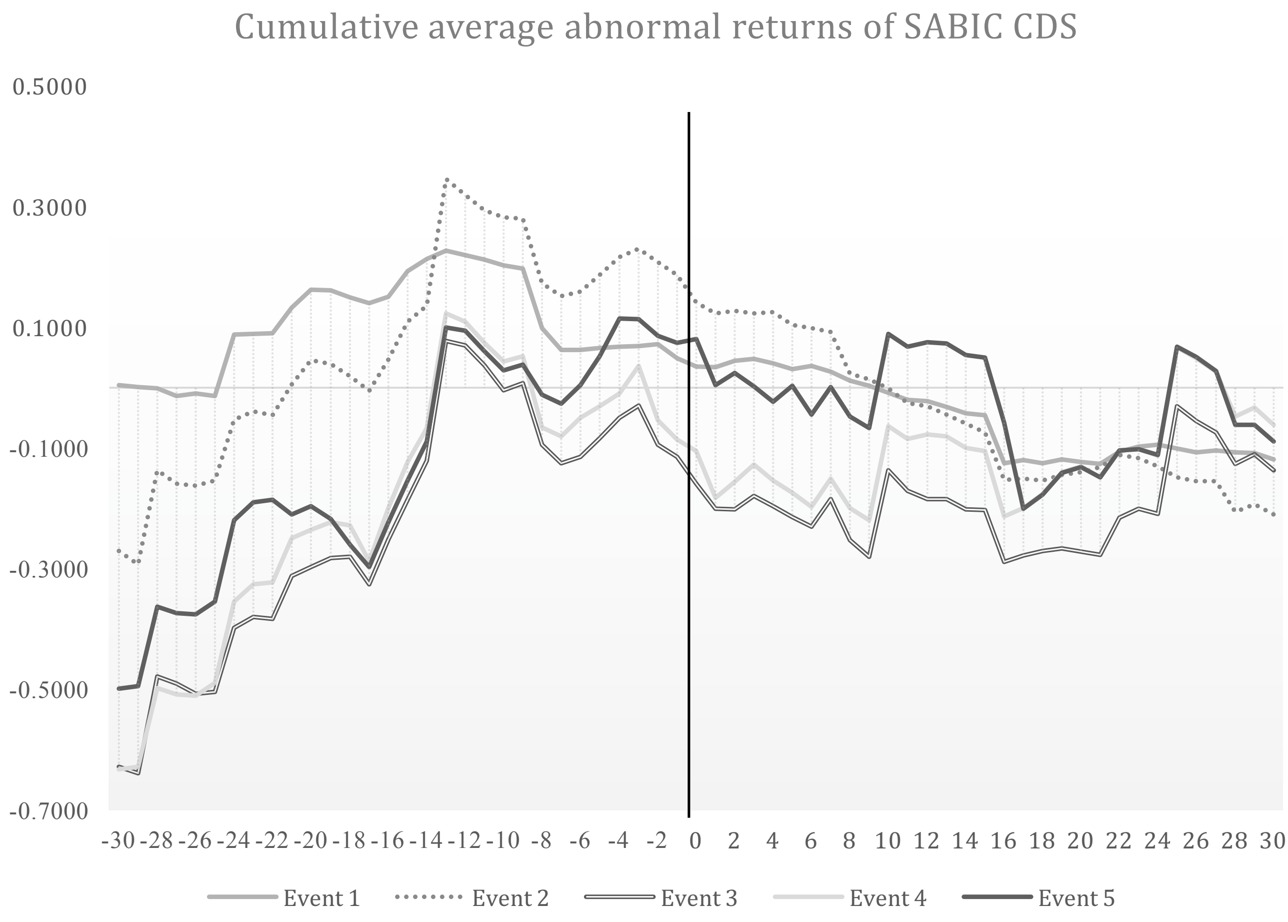

Figure 4: Cumulative Average Abnormal Return of SABIC CDS

Figure 4 shows that the returns of SABIC CDS were very volatile. Thirteen days prior to the announcement for all events, CAAR upturned to positive and to the highest point in the graph. This result suggest that investors were aware of the new information or that there was leaked information. The investors updated their positions three days before the announcement, reflecting their expectations about the announcement. Then, after the announcement, the return performance decreased to negative. The announcement did not provide any new information to the market.

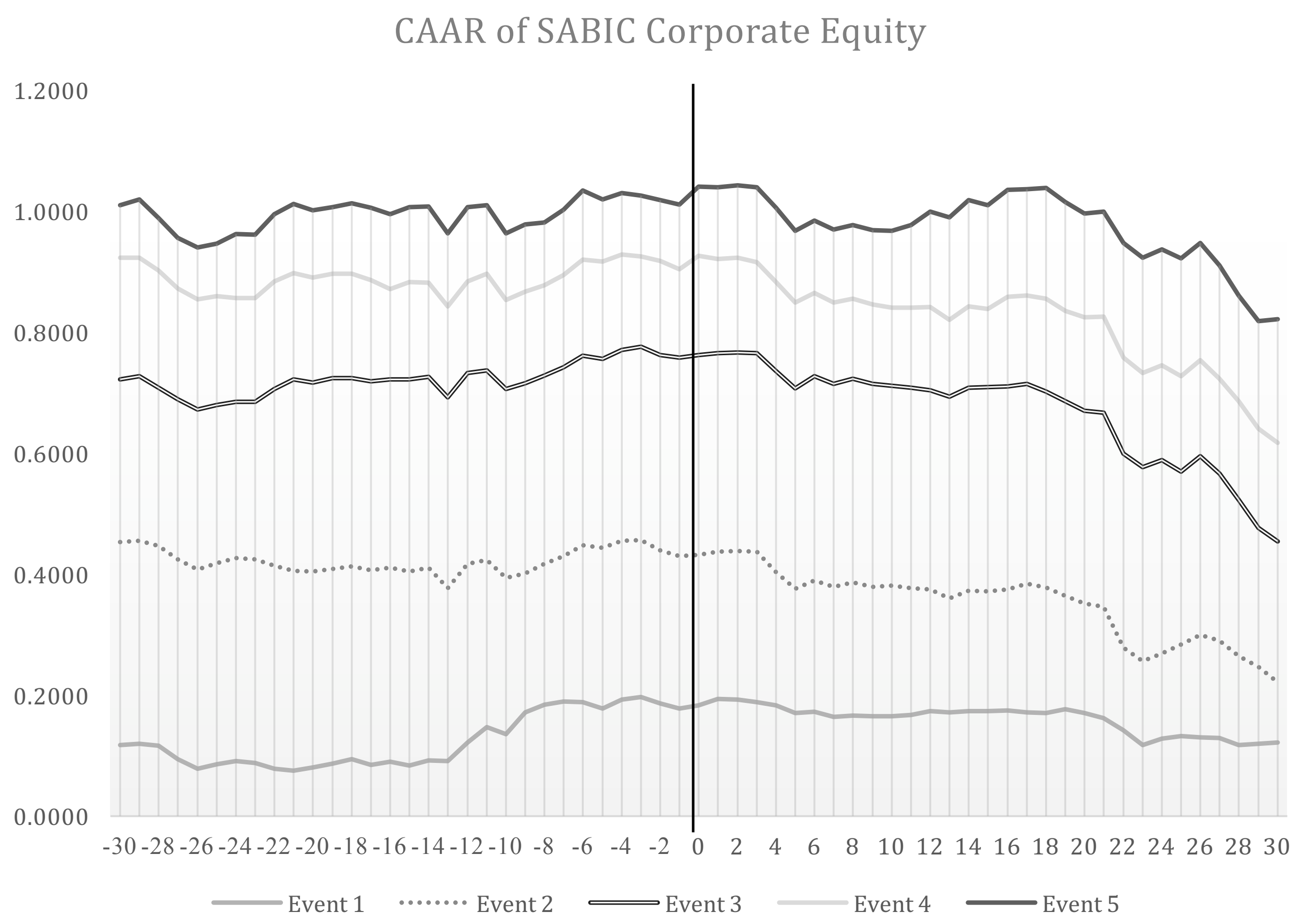

Figure 5: Cumulative Average Abnormal Return Of SABIC CEQT

Figure 5 shows stability in the return on SABIC's CEQT. Thus, this movement shows good anticipation of the stock market holders; investors had significant expectations ten days before the announcements. The investors were aware of the situation, but about 20 days after the announcements, returns declined. After the announcements, it can be observed that the announcements caused low reactions, and the reactions were positive.

From the graphs above, the return performance of SABIC CDS spread was different than the performance of SABIC equity. There was a volatility in CCDS returns and investors had significant expectations about the announcement, which proved there was a relationship between the CCDS and the credit rating announcements, while there was stability in CEQT returns which were not affected by the announcement over the event period.

4.1.2 Sovereign CAAR analysis

Table 6. Dates of Saudi sovereign events

	Event 1	**Event 2**	**Event 3**	**Event 4**	**Event 5**	**Event 6**
Moody's						February 15, 2010
S&P		February 09, 2015		January 07, 2014	May 29, 2013	
Fitch	February 26 ,2015		March 07, 2014			

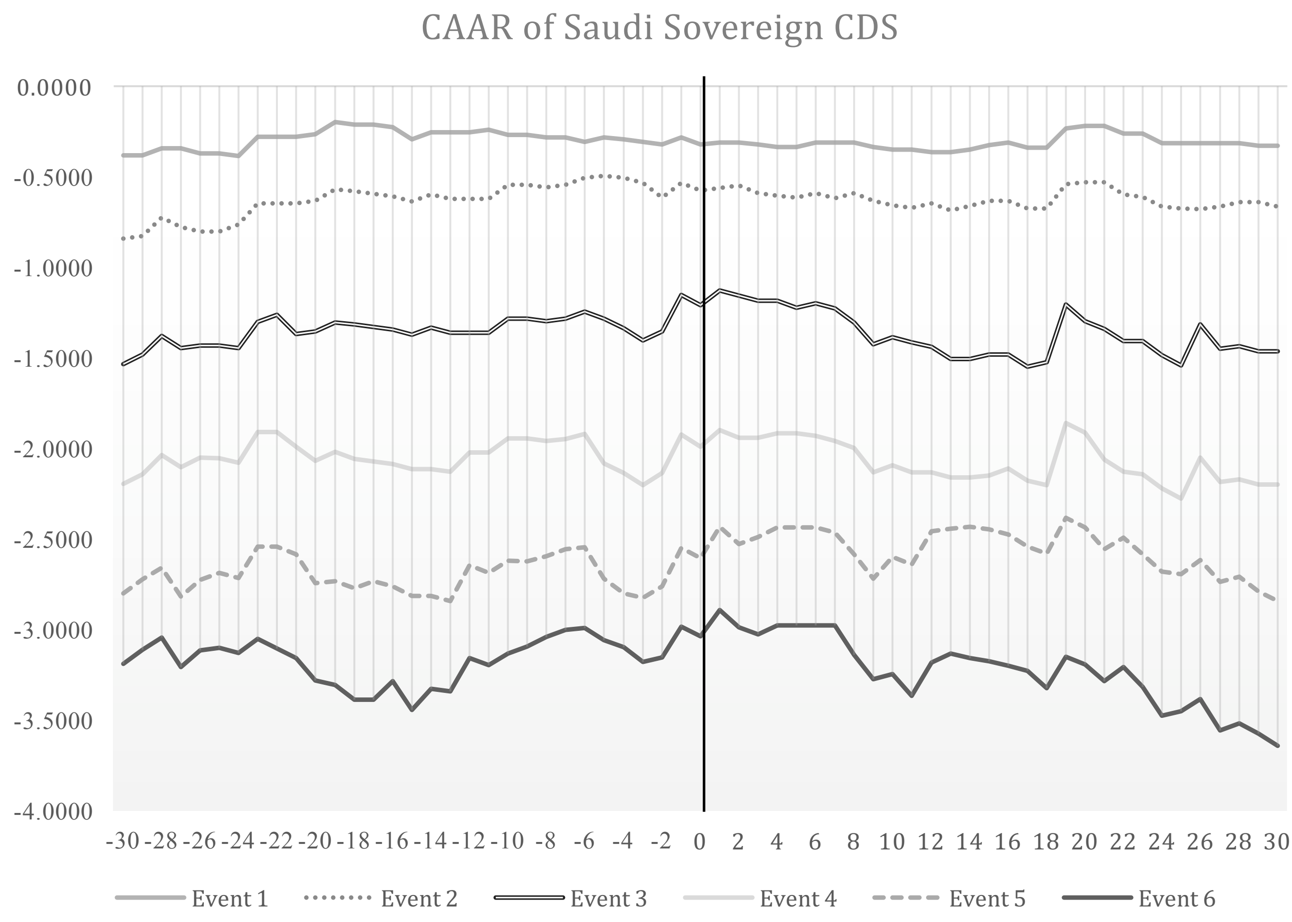

Figure 6: Cumulative Average Abnormal Return of Saudi SCDS

Figure 6 shows that all events were negative before and after the announcements. There was some volatility, but no noticeable abnormal returns during the announcement window. The efficient market hypothesis states that the constant arrival of information makes prices fluctuate, so these events are compatible with EMH.

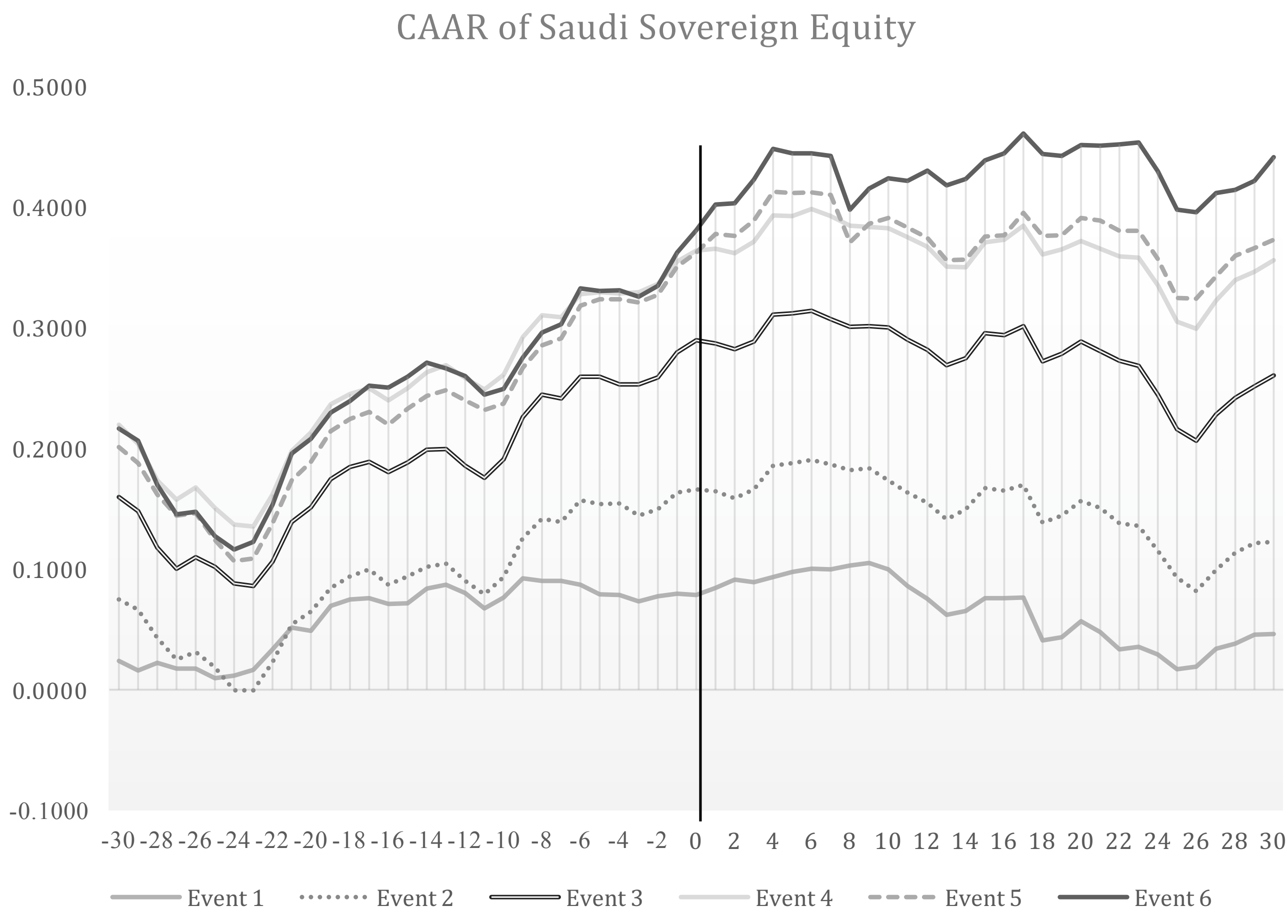

Figure 7: Cumulative average abnormal return of Saudi sovereign equity

Figure 7 shows that returns were low for all events until eight days before the announcements, then the return performance began ascending. That means the investors had significant expectations about the announcements. After the announcement days, positive performance was seen. These consequences indicate that investors had corrected their positions before the announcement days, and the announcements provided new information to the market.

From the graphs above, the reaction of the Saudi CDS market to the announcements was different than the reaction of the Saudi equity market. The graphs shows that the reaction in the SEQT was positive and proved a strong relationship between SEQT and credit rating announcements.

On the other hand, there was no relationship between the SCDS and credit rating announcements. The returns were negative and stable over all events for the period 2009-2015.

4.2. Saudi market analysis

Global markets affected the general performance of the Saudi market. The indication is that the change in the rating was moderate but the stock market was highly confused. So, the change in the rating was not because of an absence of financial knowledge about the ratings, but because the investors were sensitive to the new information. Thus, they quickly adjusted their portfolios without waiting for the rating agencies' analyses.

If the Saudi market was efficient, the CDS returns would have adjusted quickly to the new information and the investors would have reacted immediately in an unbiased manner. In that way, no investor could have generated abnormal returns after the company's credit rating was announced, because the impact of new information was already reflected in the CDS returns. In an inefficient market, the returns would result from sales and purchases by investors who had new information that was withheld from the rest of the market, instead of using public information or past prices to forecast the announcement.

In figures 4, 5, 6 and 7 above, there are small movements in the returns before the announcement. These indicate that some information leaked out. However, the research observed that after the announcement, the CDS returns changed without any visible trend, so the rating announcement did not provide new information to the market. This finding is coherent with the weak market efficiency hypothesis. The evidence is that sequential price changes in individual stocks are independent random variables. Independence indicates that the history of a series of changes cannot be used to forecast future changes.

CHAPTER 5 - CONCLUSION

This study examined the response of sovereign and corporate CDS spreads to announcements of credit rating changes from Moody's, Standard & Poor's, and Fitch, to test the relationship between CDS spreads and credit rating announcements during the years 2009 to 2015. Generally, the findings were used for testing the relationship between credit default swap spreads and credit rating announcement from the leading rating agencies. The study tried to answer the research question: do credit rating announcements provide new information to the Saudi market and is there any relationship between CDS spreads and credit rating announcements? The study found, from the figures shown in chapter 4, that the returns reaction of CCDS was volatile, and investors had significant expectations about the announcements, which proved that there was a relationship between CCDS and credit rating announcements. However, the credit rating announcements did not reveal new information to the CDS market. While there was no relationship between SCDS and credit rating announcements, the returns were negative and stable over all events for the period 2009-2015.

This research also tested the market efficiency, and found it to be efficient in a weak form. Consequently, investors in the Saudi market have an opportunity for arbitrage and abnormal profits. This finding may suggest that CDS spreads in the Saudi market do not reflect all available information. Efficient market theory suggests that if the market was efficient, the CDS spread would not have changed in reaction to credit rating announcements, because the CDS spread should have already reflected the information that was factored into the rating agency's opinion. Thus, since the Saudi market was in a weak form of efficiency, there was no relationship between CDS spreads and credit rating announcements. Consequently, the impact of abnormal CDS spreads around the announcement dates was higher than expected.

This event study provided evidence that there was a relationship between SABIC corporate CDSs and credit rating announcements, while there was no relationship between Saudi sovereign CDSs and credit rating announcements. This finding is compatible with previous studies which stated that corporate CDSs and credit ratings are strongly related and that rating announcements bring new information to the market. And, positive rating announcements had an impact on the sovereign CDS market and brought new information to the market. Moreover, specific country factors affected the CDS market. Yet, the results provide evidence that the Saudi stock market is inefficient in a weak form, which is contradictory with the theory. There are two possible reasons to justify this result: first, the most important possibility is that asymmetric information caused market inefficiency. Second, limited rationality of investors may impart some inefficiency. The Saudi market can be efficient in one period and inefficient in another; it depends on the time frame of the efficiency analysis. This is due to economic, political and social conditions. Fama (1991) stated that the market is efficient when the prices of securities reflect all relevant information.

5.1. For future researchs

Credit Default Swaps is the most important derivative and fast growing in the market and it used to measure market confidence in the soundness of corporate or sovereign issuers. Conventional CDS have many advantages, as a derivative instrument is to support trading risk of any obligations of a company without dealing with these obligations, have the ability to diversify a portfolio risk without diversifying the portfolio itself and can be used to design new financial instruments, to better achieve the needs of the risk taker and risk averse. CDS was the main reason of the recent financial crisis at 2008 so. This thesis discusses the CDS contract and proved that the contract is not completely Shariah-compliant. Yet, Naifar (2014) apply the Shariah conditions to convert Credit Default Swap into Credit Default Sharing, he examined that the principles of risk sharing confirmed by Islamic finance as a potential reform of or complement to the current financial system. And he proposed to hedge default risk by use a new financial instrument, which is a credit default sharing as an alternative for CDS that is established on risk sharing and Takaful, it is (Islamic insurance mutual cooperation and sharing responsibility).

Here are the features of Islamic Insurance (Takaful)

- Has occurred as a complementary Islamic banking system throughout the world.
- The Takaful is, sharing responsibilities and compensation in the society.
- Islamic insurance usually uses contracts based on joint-venture partnerships.

Islamic insurance is completely contradictory with Conventional Insurance that Includes elements prohibited by Islamic law, for instance gharar (uncertainty), riba (interest), and gambling. Also, there is evidence of risk sharing instead the risk shifting, Islamic bond (Sukuk) are growing over the last years that in a business transaction based on profits and losses among parties.

5.1.1. Structure of Credit Default Sharing

Credit default sharing is a financial contract between cooperative banks for hedging default risk based on the principles of risk sharing and Takaful, which implies ensuring each other. In this way, the banks are both sellers and purchasers of insurance. The Credit default sharing is follow the steps in the figure below:

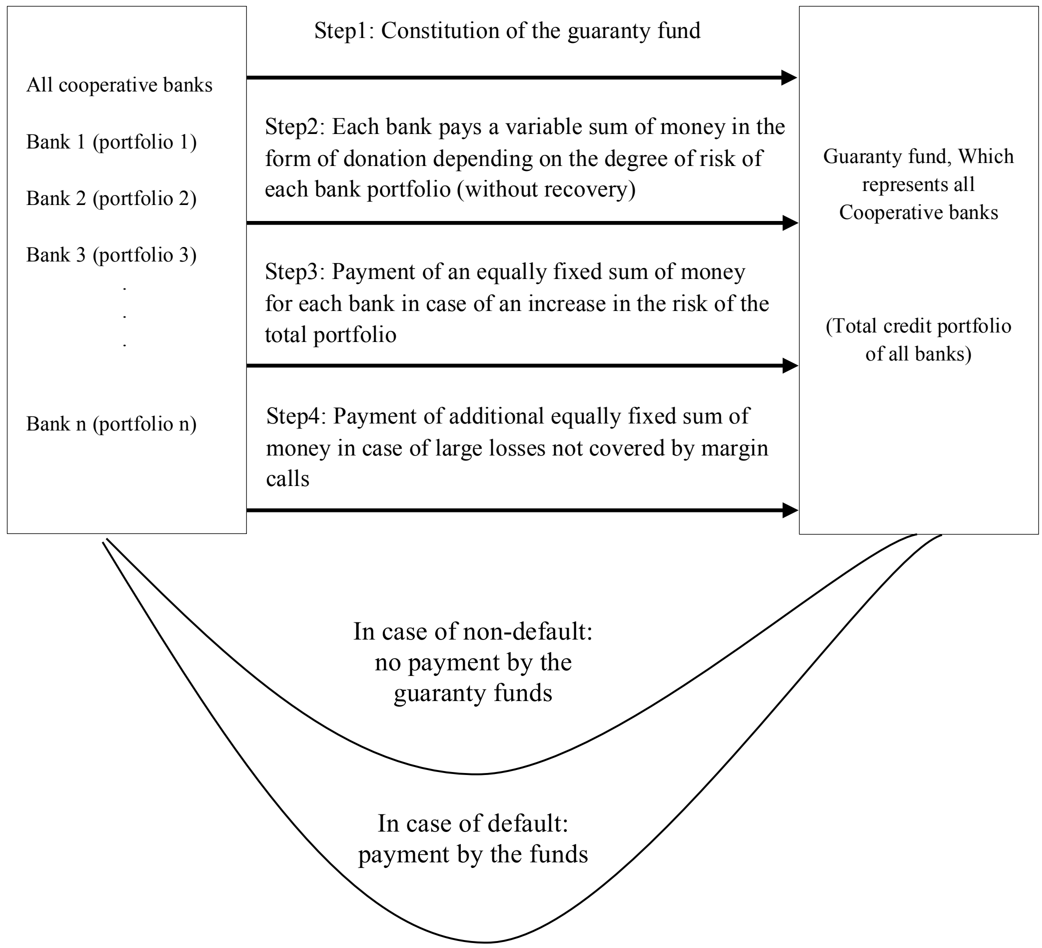

Figure 8: Structure of Credit Default Sharing

Source: Naifar (2014)

Thereafter, CDS can reduce the systemic risk and contagion in financial systems and counterparty risk, improve banks monitoring incentives and eliminate empty creditors. The financial institutions in developing and emerging markets should be avoiding the risk shifting instruments and take on the instruments that are based on hedging that are permit for mutual cooperation and risk sharing.

Accordingly, for future research this thesis advice to follow the new instrument credit default sharing as Naifar suggested. The Islamic instruments are based on sharing in profits and losses through partnership finance. The risk must hedge is the default risk, and in case of CDS should protect against the credit risk. Debt financing provides large losses in cases of default. The study advises to activate the credit default sharing and build a partnership between Takaful and Sukuk by providing protection for Sukuk holders against the risk of default.

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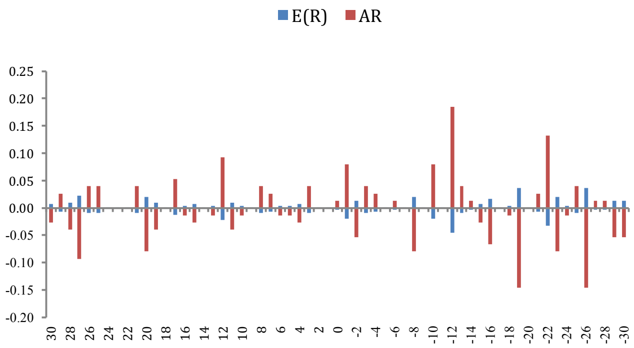
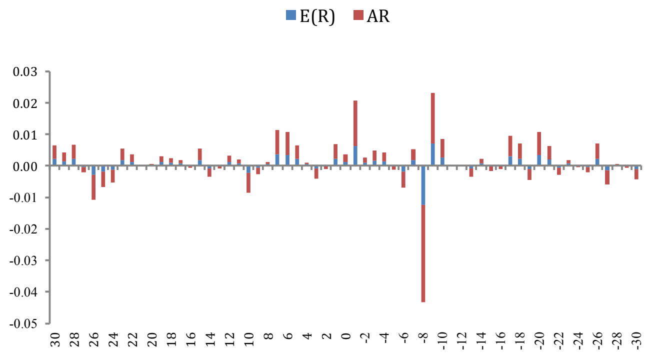
APPENDIX A: EXPECTED AND ABNORMAL RETURN AND EQUITY OF SOVEREIGN AND CORPORATE CDS

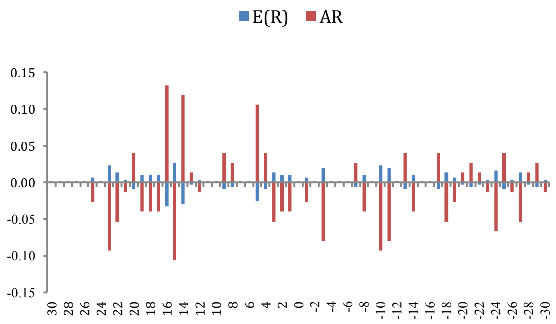
SCDS of Expected and Abnormal return (Upgrade)



SEQT of Expected and Abnormal return (Upgrade)



SCDS of Expected and Abnormal return (Upgrade)



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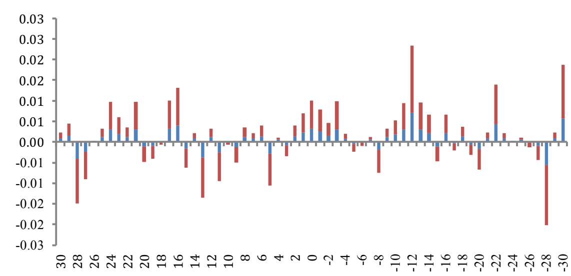
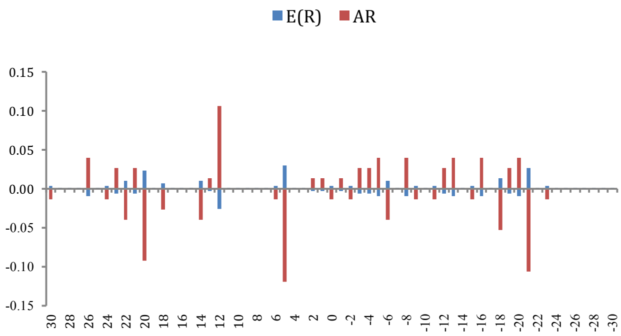
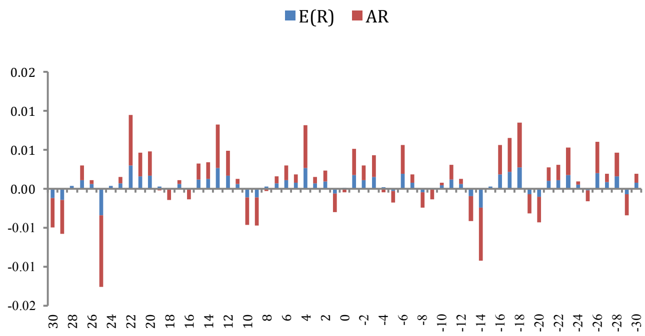
SEQT of Expected and Abnormal return (Upgrade)



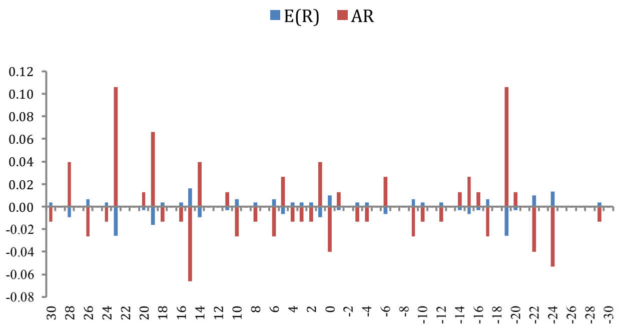
SCDS of Expected and Abnormal return (STABLE)



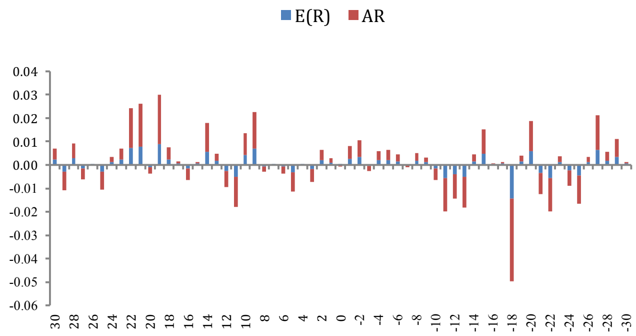
SEQT of Expected and Abnormal return (STABLE)



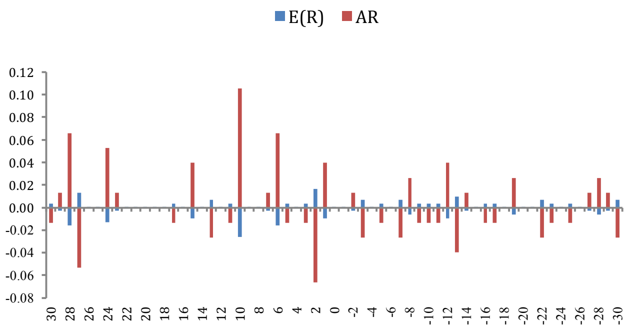
SCDS of Expected and Abnormal return (STABLE)



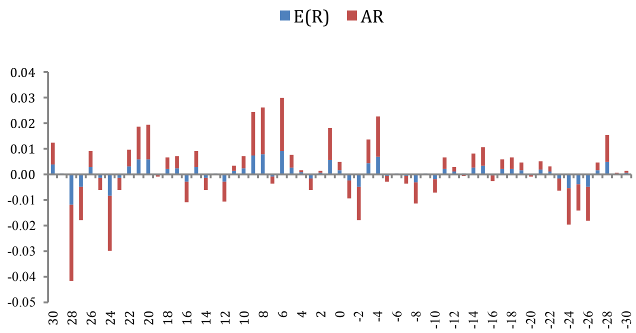
SEQT of Expected and Abnormal return (STABLE)



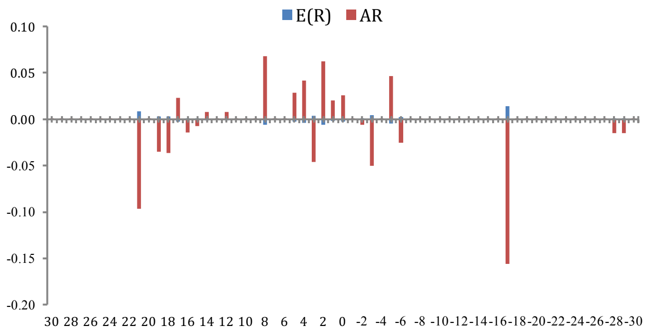
SCDS of Expected and Abnormal return (Downgrade)



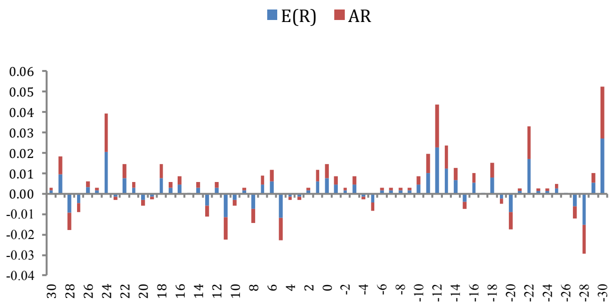
SEQT of Expected and Abnormal return (Downgrade)



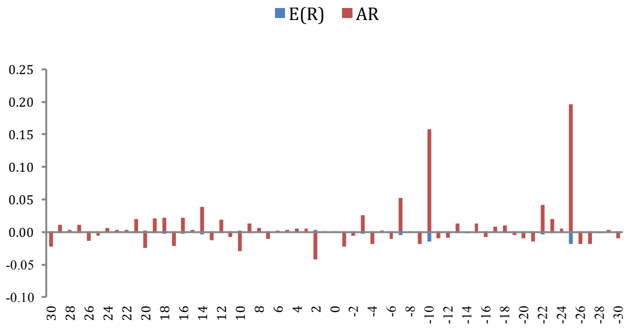
CCDS Expected and Abnormal return (STABLE and Upgeade)



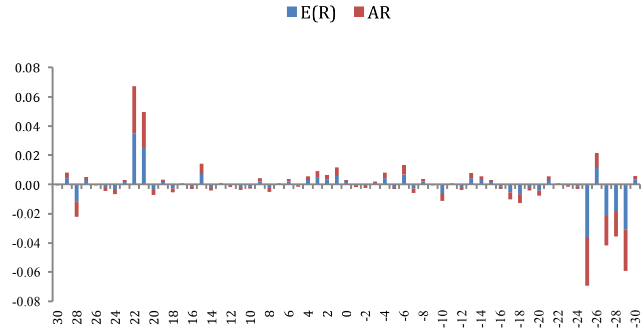
CEQT of Expected and Abnormal return (STABLE and Upgrade)



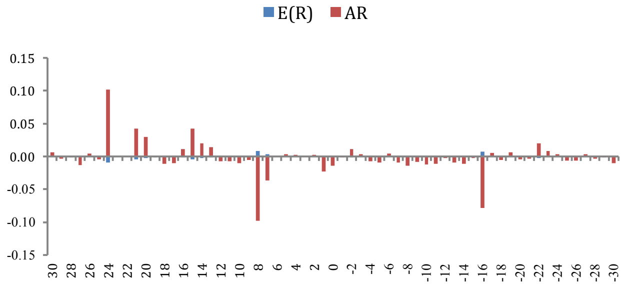
CCDS Expected and Abnormal return (STABLE)



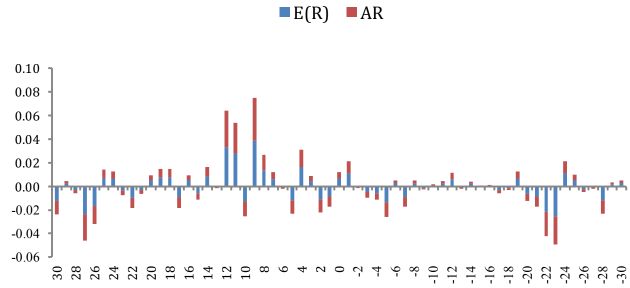
CEQT Expected and abnormal return (STABLE)



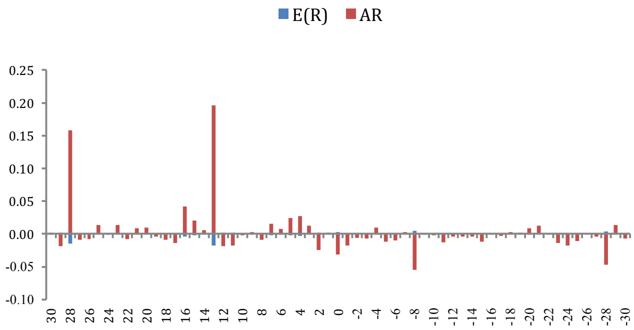
CCDS Expected and Abnormal return (Downgrade)



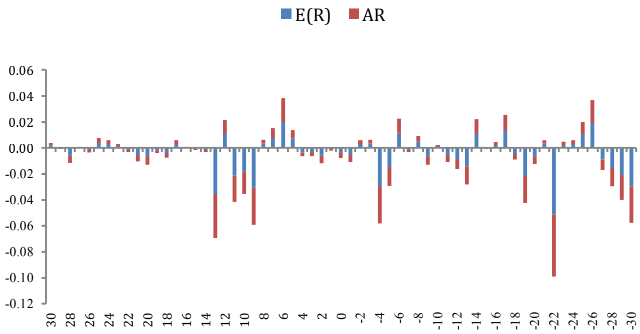
CEQT Expected and Abnormal return (Downgrade)



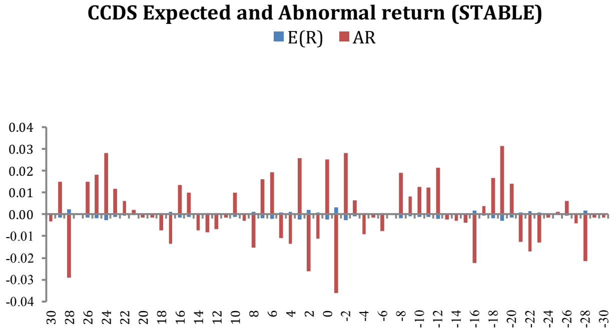
CCDS Expected and Abnormal return (STABLE)



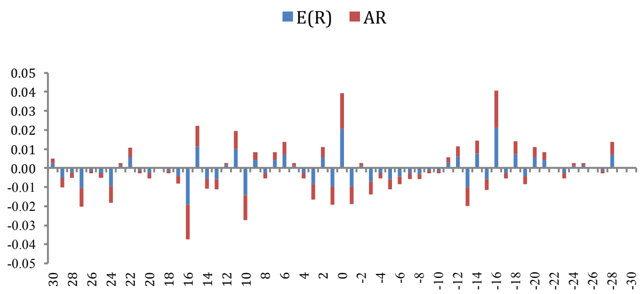
CEQT Expected and Abnormal return (STABLE)



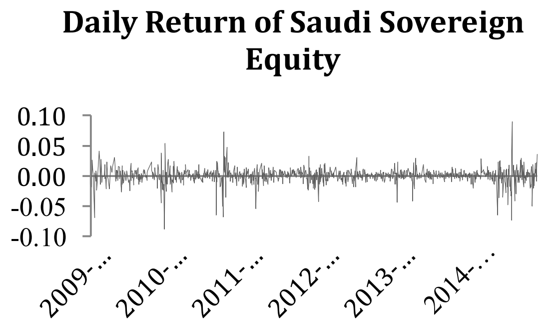
CCDS Expected and Abnormal return (STABLE)

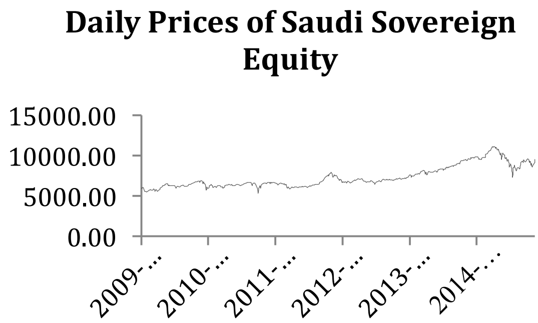


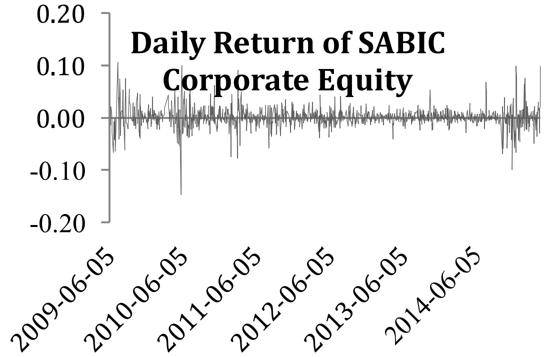
CEQT Expected and Abnormal return (STABLE)

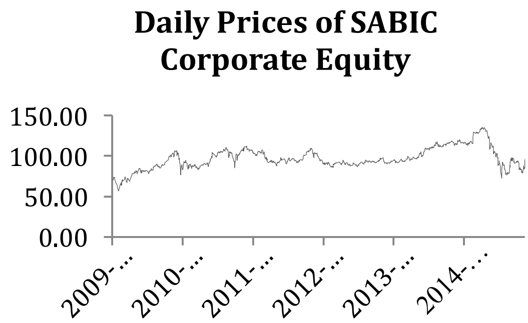


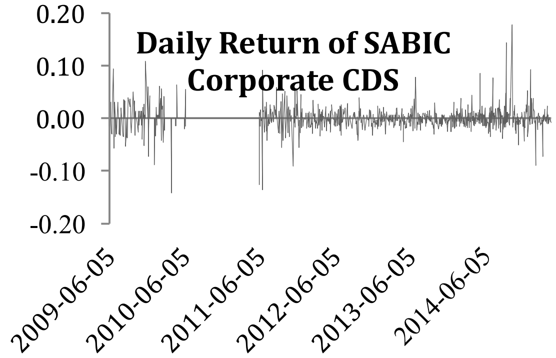
APPENDIX B: AVERAGE DAILY PRICES AND RETURN OF SAUDI CEQT AND CCDS

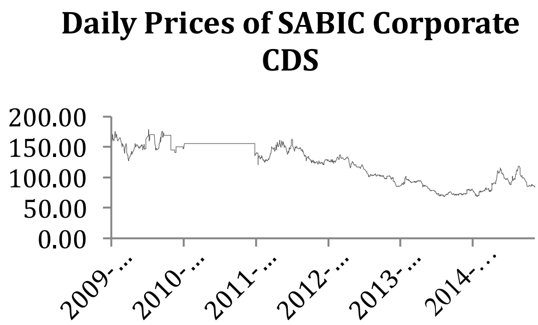


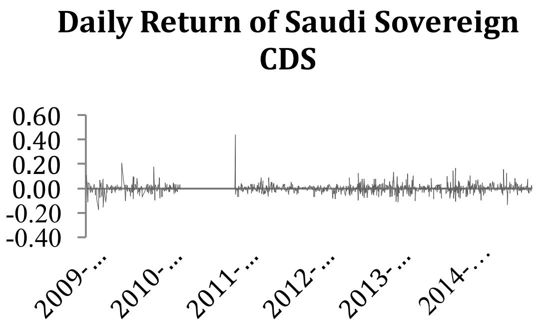


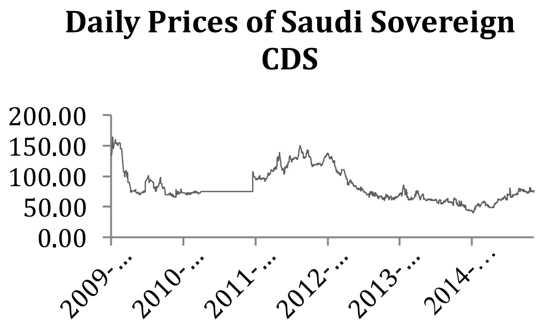









Daily Return of Saudi Sovereign CDS
0.60
0.40
0.20
0.00
-0.20
-0.40
2009-…
2010-…
2011-…
2012-…
2013-…
2014-…


Daily Prices of Saudi Sovereign CDS
200.00
150.00
100.00
50.00
0.00
2009-…
2010-…
2011-…
2012-…
2013-…
2014-…

APPENDIX C: ESTIMATION OF CAAR FOR SAUDI STOCK MARKET

SEQT	-30	-20	-10	0	10	20	30
Downgrade							
T-test	0.055	-0.087	-0.468	0.277	0.409	1.180	0.738
STABLE							
T-test	0.097	-0.289	0.026	-0.043	-0.311	0.275	-0.328
Upgrade							
T-test	1.138	-0.440	0.305	0.606	-0.056	-0.319	0.126
STABLE							
T-test	0.055	1.148	-0.421	-0.067	0.820	-0.258	0.419
Upgrade							
T-test	-0.281	0.652	0.502	0.199	-0.552	0.007	0.387
Upgrade							
T-test	0.667	-0.197	0.776	0.662	0.126	0.166	0.055

SCDS	-30	-20	-10	0	10	20	30
Downgrade							
T-test	-0.803	-0.006	-0.404	-0.006	3.182	-0.006	-0.404
STABLE							
T-test	-0.006	0.393	-0.404	-1.201	-0.803	0.393	-0.404
Upgrade							
T-test	0.791	-3.193	1.987	-0.404	-0.006	-0.006	0.791
STABLE							
T-test	-0.006	1.190	-0.006	-0.404	-0.006	-2.795	-0.404
Upgrade							
T-test	-1.600	-0.006	2.385	0.393	-0.404	-2.396	-0.803
Upgrade							
T-test	-0.404	0.393	-2.795	-0.006	-0.006	1.190	-0.006

CEQT	-30	-20	-10	0	10	20	30
STABLE and Upgrade							
T-test	1.446	-0.483	0.229	0.397	-0.161	-0.160	0.081
STABLE							
T-test	-0.003	0.305	-0.082	1.080	-0.752	-0.148	0.136
STABLE							
T-test	0.169	-0.211	-0.313	0.085	-0.073	-0.201	-0.019
STABLE							
T-test	-1.593	-0.350	0.069	-0.222	-0.978	-0.354	0.102
Downgrade							
T-test	0.133	-0.344	0.040	0.332	-0.701	0.261	-0.657

CCDS	-30	-20	-10	0	10	20	30
STABLE and Upgrade							
T-test	0.014	0.014	0.014	1.360	0.014	0.014	0.014
STABLE							
T-test	-0.075	0.739	0.653	1.322	0.513	-0.075	-0.179
STABLE							
T-test	-0.484	-0.486	8.269	0.018	-1.519	-1.285	-1.156
STABLE							
T-test	-0.371	0.455	-0.119	-1.642	-0.104	0.510	0.093
Downgrade							
T-test	-0.539	-0.222	-0.628	-0.735	-0.526	1.565	0.306