# The impact of sovereign rating changes on equity markets: The Case of GCC countries

# تأثير تغيرات التصنيف السيادي على أسواق الأسهم: حالة دول مجلس التعاون الخليجي


**by**

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## Abstract

This study investigates how GCC stock markets react to a change in the domestic currency sovereign credit ratings. This paper makes use of an event study with an underlying market model. The sovereign ratings and stock market prices were retrieved from the Thomson Reuters DataStream database. In total, 83 rating events were tested, 39 of which are upgrades, 44 as downgrades. The period tested spans from 2002 to 2017.

The results coincide with previous literature; concluding that GCC markets do react to sovereign rating changes, with stronger reactions in the case of downgrades. Furthermore, the results also showed that GCC stock markets are indifferent to whether the sovereign rating was of the short term or long term variety. Moreover, GCC stock markets are indifferent to which credit rating agency issued the sovereign rating. Finally, the results show that of the Saudi, Omani, Qatari, and Bahraini stock markets, the Qatari stock market is the most sensitive to a sovereign rating change, particularly in the case of downgrades.

# نبذة مختصرة

تفحص هذه الدراسة عن تأثير الأسواق المالية على التغيرات التي تواجه التصنيفات الائتمانية في الدول مجلس تعاون الخليج. تم استخراج المعلومات في هذه الدراسة من قاعدة بيانات توماس رويترز. استخلصت قاعدة البيانات أن ٨٣ من احداث التقييم، ٣٣ كانت من نوع التطوير و ٤٤ حدث كان من التخفيض. بالإضافة، تتمحور الفترة الزمنية لاختبارات قاعدة البيان ما بين سنة ٢٠٠٢ حتى سنة ٢٠١٧.

النتائج تتوافق و تتزامن مع المراجعات التي تستنتِج و تختِم أن أسواق مجلس التعاون الخليجي تتفاعل و تتاثر من تقلبات التصانيف.

علاوة على ذلك، نتائج الدراسة أثبتت أيضا أن أسواق مجلس التعاون الخليجي لا تختلف تماما سواء كانت التصانيف قصيرة الأجل أم طويلة الأجل. بالاضافة، أسواق مجلس التعاون الخليجي لا تتأثر بمقارنة مع قطر هو الاكثر حساسية في حالات الانحدار.

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## Abbreviations

- Credit Rating Agency : CRA[s]
- Nationally recognised statistical rating organisation: NRSRO
- Securities and Exchange Commission: SEC
- Collateralized Debt obligation: CDO[s]
- Asset backed security: ABS[s]
- Dodd-Frank Wall Street reform and consumer protections act: Dodd-Frank
- Efficient market hypothesis: EMH
- Gulf cooperation council: GCC
- Abnormal returns: AR
- Average abnormal returns: AAR
- Cumulative abnormal returns: CAR
- Cumulative average abnormal returns: CAAR

## Definitions

- Credit rating agencies:
    - "Refer[s] to those entities whose business is the issuance of credit ratings for the purposes of evaluating the credit risk of issuers of debt and debt-like securities." (International Organization of Securities Commissions, 2004)
- Credit rating:
    - "An opinion regarding the creditworthiness of an entity, a credit commitment, a debt or debt-like security or an issuer of such obligations, expressed using an established and defined ranking system." (International Organization of Securities Commissions, 2004)
- Nationally recognised statistical rating organisation (NRSRO)
    - "an entity
        - (i) that issues publicly available credit ratings that are current assessments of the creditworthiness of obligors with respect to specific securities or money market instruments;
        - (ii) is generally accepted in the financial markets as an issuer of credible and reliable ratings, including ratings for a particular industry or geographic segment, by the predominant users of securities ratings; and
        - (iii) uses systematic procedures designed to ensure credible and reliable ratings, manage potential conflicts of interest, and prevent the misuse of nonpublic information, and has sufficient financial resources to ensure compliance with those procedures."
- Unsolicited credit rating
    - "ratings that credit rating agencies conduct without being formally engaged to do so by the issuer" (International Organization of Securities Commissions, 2003)
- Efficient market hypothesis (EMH)
    - "When information arises, the news spreads very quickly and is incorporated into the prices of securities without delay." (Malkiel, 2003)
- Event Study

- An “event studies examine the behavior of firms’ stock prices around corporate events.” (Kothari and Warner, 2004)

# 1 CHAPTER ONE: Introduction

## 1.1 Credit Rating & Credit Rating Agencies

Credit rating agencies (CRAs) play a massive role in the modern financial ecosystem. Their key products; credit ratings, are used as a guide for investors, aiding them in making optimal investment decisions with ease. Furthermore, credit ratings have been adopted by regulatory authorities as a proxy for credit default risk[1].

### 1.1.1 A history of the credit ratings

The earliest form of the CRA officially began operations in 1865 as an annual journal publication. It provided statistics concerning railroad companies in the US, this journal was referred to as Poor's manual of Railroads of the United States. Poor realised that railroad companies in the US were producing bonded debt at a scale that dwarfs the markets for Dutch, English, or US sovereign bond markets and that European investors required more information before buying debt from US railroad companies and thus the manual was published to fulfil the niche aiding European investors in making the decision whether to invest in US railroad companies. (Caribbean Information & Credit Rating Services Ltd., n.d.)

In 1909 whilst Poor was only producing statistics and information John Moody published a similar manual however, Moody decided to add his opinion of the credit worthiness of each institution to complement the statistics, seven years later, Poor's followed suit and began publishing an opinion. The widely used and appreciated credit rating symbols used today were first introduced by Fitch Publishing Company in 1924

1931 was a key year for the credit rating sector; as it was the first time the US Treasury accepted credit ratings as a measure of credit worthiness for national banks. This was the first time the US government formally acknowledged credit ratings and the industry behind it, highlighting -for the first

[1] in order to calculate the relevant minimum capital requirements for example

time- the importance of having an independent third party to assess credit worthiness. (Caribbean Information & Credit Rating Services Ltd., n.d.)

### 1.1.2 Credit rating symbology

The most commonly used ratings are those from S&P, there are two different categories of symbols used: long term ratings, and short term rating. The long term ratings use the AAA-D scale with AAA denoting that a company has an "extremely strong capacity to meet its financial commitments." and D denoting a high probability of default (S&P Global, 2017). S&P uses the AAA-D symbols in conjunction with a + or – symbol to denote whether a rating is on the high end or low end of the category it has been assigned

The S&P short term ratings use the A-1 to D scale, with A-1 being the highest possible short term rating followed by A-2 and so on ending with the lowest possible rating of D. The distinction between long term and short term ratings is due to the fact that there might be a discrepancy between an issuers credit worthiness in the short term compared to the long term or vice versa.

Moodys uses the same long term symbology as S&P however it adds a numeric element to denote whether the rating is on the high-end or low end of that rating category with 1 being highest and 3 being lowest[2]. (Moody's Investor Service, 2017)

### 1.1.3 Credit rating methodologies

The exact methodologies and underlying mathematical models used to determine credit ratings are unique to each CRA and are kept under lock and key. However CRAs do offer some insights on how they arrive to their ratings -for the sake of transparency-

A combination of both mathematical models and "analyst driven research" are used to determine ratings for S&P, with mathematical models focusing exclusively on quantitative data. As for the analyst driven research; a team of S&P analysts obtain published reports and use them in combination

[2] As opposed to S&Ps +/- system

with interviews -with the issuer's management- and by applying their skills and expertise determine the financial standing of the institution[3]

### 1.1.4 Credit ratings in a regulatory capacity

The SEC introduced the nationally recognised statistical rating organisation (NRSRO) status in 1975. The purpose of the recognition of CRAs as NRSROs was to determine which CRAs were appropriate to make use of in a regulatory capacity[4]. Over time the use of credit ratings in regulation increased and credit ratings became an integral part of credit default regulations. (Securities and Exchange Commission, 2005)

The NRSRO concept has been criticised by scholars who argue that due to the inherent difficulties in becoming an NRSRO and the relatively small number of NRSROs, any new information that is provided by an NRSRO is redundant as its already accounted for, "Put simply, credit ratings are important because regulations say they are." (Partnoy, 2001, pp. 2-3)

### 1.1.5 Payment models for CRAs

Early CRA's main source of revenue was directly from the investors, who paid a fee in order to access the ratings; this was referred to as the investor-pays model. However, in the 1970s with the advent of the photocopier and the fax, piracy became an issue; therefore the investor pays model was substituted for the still in use issuer-pays model, where the institutions being rated pay for the privilege. (Kant, 2014)

The move to an issuer pays model has been widely criticised due to the potential for conflicts of interest. John Jiang (2012) compared Moodys ratings using the issuer pays model to S&P ratings using the investor pays model in the same period[5]. The paper concluded that S&P's ratings were lower than Moodys. However, once S&P also adopted the issuer-pays model, its ratings increase to be

[3] This process has to go through several committees before arriving at the final verdict

[4] Mainly how much capital should corporations hold as a margin of safety against the credit default risk

[5] As Moodys adopted the issuer pays model first

on par with Moody's. In effect the study suggests that the issuer-pays model leads to higher ratings compared to the investor pays model.

### 1.1.6 Market share of CRAs

The CRA market has been -not unjustly- labelled an oligopoly due to S&P, Moodys, and Fitch dominance over the market, leading them to be referred to as the 'big three'. According to the SECs annual report on NRSROs in 2016 the outstanding credit ratings of the big three account for 49.1%, 34.4% and 13% of all outstanding credit ratings for S&P, Moodys, and Fitch respectively. Effectively 96.5% of the US NRSRO credit rating market in 2016 was dominated by the big three.

The consequences of such a market lead to predatory pricings as the market players –due to their large market shares- have the power to set arbitrary pricing with little to no consequences due to the lack of competition. This sparse competition is a consequence of to two main factors, first the difficulty of entry into the sector; which is caused by the NRSRO status and difficulty in attaining the status. The second reason for is the crowding out of smaller credit ratings agencies as larger ones attract more business due to their ever increasing resources and capabilities, creating a significant gap in capabilities between one of the big three compared to a new credit rating agency.

The consequences of such an oligopolistic market is that issuers will have little choice when deciding which credit rating agency to use, issuers usually choose to conform with the rest of the market and simply choose one of the big three credit rating agencies empowering the oligopolistic market further.

### 1.1.7 Solicited v. unsolicited credit ratings

Unsolicited ratings are credit ratings that are issued without the consent of the entity being rated, whereas solicited ratings are issued when the entity being rated has requested the rating. The most publicised case of unsolicited ratings was the 1993 Jefferson county school district v. Moody's case, where school district alleged that Moody's interfered with its bond sales by issuing negative unsolicited ratings; Moody's defence argued that the ratings that were issued were opinions and therefore were under the protection of the United States first amendment as free speech. The school

district argued that Moody's was retaliating as they were not hired for the rating of the issue.[6] The case concluded in favour of Moody's and was dismissed[7]. (Eaton, 1996) This case serves to highlight the strength that credit rating agencies hold and how they can easily sway investors with their opinions. Moreover, it highlights a lack of oversight from the regulatory authorities when it comes to unsolicited ratings.

Research has proven that unsolicited ratings are on average lower than solicited ratings (National Bank of Belgium, 2006) (Fulghieri, Strobl and Xia, 2013) which leads to a topic of serious debate regarding whether CRAs should be conducting any rating actions without the issuers consent.

### 1.1.8 Types of credit ratings

According to S&P there are two types of credit ratings, general-purpose and special-purpose: General-purpose credit ratings are commonly referred to as traditional credit ratings: there are two subclasses of general-purpose credit ratings, issue and issuer ratings: An Issue rating is concerned with a specific credit obligation whereas an issuer[8] rating is concerned with the credit worthiness of the issuer as a whole. Both issue and issuer ratings can be either long term or short term.

Moreover, a credit rating is issued in either local currency or foreign currency; the difference being whether an issuer's credit worthiness differs based on which currency the debt is denominated in.

A rating outlook "assesses the potential direction of a long-term credit rating over the intermediate term" (S&P Global, 2017, pp.9) allowing investors to gauge whether a credit rating will change in the future.

With regards to special purpose ratings, there are numerous different categories, for example: the fund credit quality rating and the fund volatility rating; which rate a fixed income fund's credit worthiness and volatility of returns respectively. Special purpose ratings also include the rating of insurance companies swap risks and counterparty risks amongst others.

[6] Fitch and S&P were.
[7] Multiple appeals were filed however all were dismissed.
[8] Note that an issuer can be a corporation/company or a sovereign nation, hence sovereign ratings.

### 1.1.9 Availability of credit ratings

An essential component for the functioning of credit ratings is that they are readily available to the public; therefore most credit rating agencies provide up to date credit rating information on their websites. That being said, finding historic credit ratings is a more complicated endeavour, as out of the big three only Moodys publishes historic credit ratings on its website, therefore in order to retrieve historic credit rating information third party investor information software must be used such as the Bloomberg terminal or Thomson Reuters DataStream.

### 1.1.10 Criticisms of credit rating agencies

CRAs have been under heavy scrutiny since the 2008 financial crisis; particularly after it was discovered that some securitised product's ratings were inflated as the subprime underlying securities were not properly accounted for (Gupta et al, 2010). The subprime crisis was a consequence of rampant use of asset backed securities (ABS) & collateralised debt obligations (CDO) moreover; financial engineers created CDOs with the underlying's being other CDOs these instruments were referred to as $CDO^2$ such instruments –perhaps unwillingly- served to obfuscate the subprime debt underlying all these securities. An unnamed analyst working for one of the big three CRAs wrote referencing such securities "it could be structured by cows and we would rate it." (United States Securities and Exchange Commission, 2008. P.12) when the housing bubble finally collapsed, all these seemingly safe and well rated securities began defaulting. Much of the blame fell on credit rating agencies for failing to account for all the risk associated with CDOs. The failure of credit rating agencies amongst others lead to the creation of the Dodd-Frank Wall Street reform and consumer protections act (Dodd-Frank) which –amongst other things- increased scrutiny on NRSROs; forcing annual reports on internal controls, disclosures, fines, penalties, and more[9].

Other criticisms of CRAs have been the potential for conflicts of interest within their non-rating services such as the rating evaluation service; which is a service where potential risks or activities are described by the issuer to the CRA who would then determine how such events would impact the

[9] See SECs Dodd-Frank website for more information (https://www.sec.gov/spotlight/dodd-frank/creditratingagencies.shtml)

credit rating of the issuer. The main objection that critics have with this service is that issuers might be pressured to use these services to improve their standing with their CRA. Moreover, another risk from the rating evaluation service is that if a simulation determines that a credit rating change is not warranted and the issuer goes through with the change, the CRA is then obligated not to change the credit rating even if it deemed it necessary in hindsight. (Partnoy 2006)

### 1.1.11 The efficient market hypothesis

The efficient market hypothesis (EMH) is a theory proposed by Nobel Prize winning economist Eugene Fama in the 1965 paper 'The Behavior of Stock-Market Prices', the theory was later revised in the 1970s paper "Efficient Capital Market: review and framework"

The core tenant of the theory is that an efficient market is a market where prices reflect all available information; therefore theoretically it would be impossible to generate abnormal returns or alpha using any publically available information.

There are three commonly known forms of EMH: weak form, semi-strong form, and strong form. Weak form suggests that the market only accounts for historic information, and does not account for current publically available information or private information. Semi-strong form assumes that the market takes into account historic information and publically available information but not private information. As for strong form; it assumes that the market takes into account historic, public, and private information therefore not even insiders are capable of generating alpha.

Credit ratings are often referred to as opinions by the CRAs that produce them, opinions that are developed using publically available information. Therefore, assuming a semi-strong efficient market, credit ratings should have no influence on returns because they do not add any new information to the market. Hence, by testing for the influence of credit ratings on stock returns this paper will inadvertently also be testing whether the market is semi-strong efficient.

## 1.2 Statement of the Problem

The question of whether credit ratings are useful has plagued academics for a long time, particularly when the efficient market hypothesis was at the peak of its popularity. Whether credit rating agencies conduct business ethically with unsolicited services and potentials for conflict of interest should be ignored in this paper as the question this paper attempts to answer is whether the credit ratings themselves are useful to investors in the GCC or whether they add no new information.

There is no ideal situation when it comes to the effect of sovereign credit ratings on stock markets. Furthermore, (Bissoondoyal-Bheenick, 2012) has shown that between countries who share strong financial links, a foreign sovereign rating change does have international spill over effects, for both upgrades and downgrades. Therefore, countries that have close financial ties could face spill over effects when another country's sovereign rating is changed. With a closely interrelated bloc such as the GCC the spill over effects would be compounded.

If the GCC stock markets do react to changes in sovereign ratings, that would demonstrate that a change in the sovereign credit rating does carry new information; information that has previously not been accounted for by the market, explaining the reaction.

By analysing whether or not sovereign ratings have an influence on markets, investors can use that information to time their investments in order to generate some abnormal returns, moreover companies can use that information to time stock buybacks and stock issues in-order to maximise their efficiency.

This paper exists to provide information on the stock markets in the GCC and the players in said market. Hence, the problem statement: to what extent do sovereign ratings affect GCC stock markets.

## 1.3 Rationale and significance of the study

The rationale behind this paper is to investigate an effect that has not been thoroughly studied in the GCC, the reasoning behind the lack of research is due to the fact that the GCC market is still

relatively new to sovereign ratings as GCC countries shied away from issuing debt due to the vast oil wealth in the region.

However, recently, there has been a significant fall in oil prices (Evans-Pritchard, 2015), leading some GCC countries to scramble to issue new debt and to diversify. Sovereign ratings on GCC countries have suffered due to the current oil glut. That, combined with adverse geo-political situations (Firzli, 2014) have been seen as severe risks for the region and fall in sovereign ratings echo such sentiments.

This paper attempts to fill the gap in the literature with regards to the effects of credit ratings in this region. Moreover, it would add to the research done when investigating the phenomena in other developing countries.

## 1.4 Research questions

Do changes in sovereign credit ratings have a measurable impact on local stock returns in GCC countries?

Do sovereign credit rating upgrades have a measurable impact on stock returns compared to downgrades?

Is there any difference between the stock market's reactions for a change in a short term sovereign rating as opposed a long term sovereign rating?

Is there a significant difference between the reactions based on which credit rating agency issued the rating?

Is there a significant difference between the reactions based on the country that is being rated?

## 1.5 Purpose of the study

To investigate whether changes in sovereign credit ratings in the GCC have any influence on the relevant stock markets, and if so which type of rating[10] has the strongest influence and is there any difference between the reaction to an upgrade vs. the reaction to downgrade.

## 1.6 Objectives of the study

### 1.6.1 General objective

To determine whether sovereign credit ratings have any influence on GCC stock markets.

### 1.6.2 Specific objectives

- To quantitatively assess whether sovereign credit ratings changes have any influence on the stock market's returns.
- To assess whether the stock markets react differently for sovereign rating upgrades compared to downgrades.
- To assess whether the stock markets react differently for a change in the long term sovereign ratings compared to a change in the short term sovereign ratings
- To assess whether stock markets react differently for a sovereign ratings change based on which CRA issued the rating
- To assess whether the stock markets react differently based on which country is being rated.

## 1.7 Relevance of the study

The effects sovereign ratings have on bond markets have been studied thoroughly, whereas the contamination effects of sovereign rating changes on stock markets has been sparsely explored, therefore any paper testing this effect will be a vital addition to the paltry amount of literature regarding this topic.

This paper is also relevant as it tests the GCC perspective, which is found to be sorely lacking, after comprehensive research, only one paper was found that tests the effects of sovereign ratings in the

[10] Short vs. long term

GCC; however, the paper only covered one country[11] (Abdeldayem and Nekhili, 2016) Therefore with the addition of this research, the GCC perspective can be better understood as whole.

[11] Bahrain

# 2 CHAPTER TWO: Literature Review & Theoretical Framework

## 2.1 Introduction

The effect of changes in credit ratings on stock returns has been studied thoroughly. However, the majority of previous literature examined this effect at the corporate level; by analysing the effects of changes in corporate credit ratings on the company's stock return. However, there are several papers that have studied this effect at a sovereign level.

Both types of papers will be examined in this chapter.[12] This is because, whilst both study somewhat different effects, the methodologies used to conduct the studies are largely similar meaning that examining both types will aide in the development of a suitable methodology for investigating the effect on the sovereign level. Moreover, it would be interesting to compare whether the conclusions of the corporate papers differ from those of the sovereign papers.

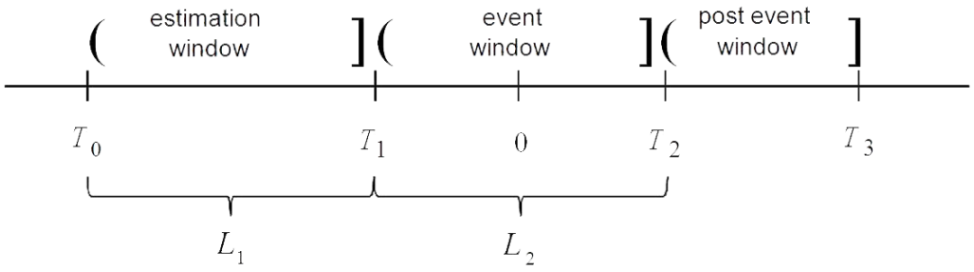
### 2.1.1 Methods used in previous papers

Certain methodologies appear to be the standard for testing the effects of credit ratings on stock market returns. The vast majority of the previous literature uses one of the following methods:

[12] The ones studying the effect of corporate ratings changes on stock return and those studying the effect of sovereign rating changes on stock returns

#### *2.1.1.1 Event studies*

Event studies are not a new topic in finance. The first popular article using event studies was James Dolley's paper testing the effects of stock splits on stock returns (MacKinlay, 1997). After which event studies evolved from being used to test the effects of corporate finance decisions on stock returns to testing the effects of numerous other events such as new information, credit ratings, and political events. The majority of modern event studies are based on the (Fama et al., 1969 paper which tested for the informational effect in stock returns.




##### 2.1.1.1.1 Estimation window

The estimation window in an event study is the period of time -usually before the event –that is used to model the 'normal' return (the return assuming an event does not occur)

##### 2.1.1.1.2 Event window

This is the time period around the event that is used to demonstrate whether abnormal returns have been generated or not. Event windows exist to account for pre-event anticipation/information leaks or late reactions/over-reactions and then compensation.

#### *2.1.1.2 Regression analysis*

The majority of papers used event studies however, some researchers decided to use regression analysis. This is done by using a rating's dummy variable and adding it to a market model[13] regression and testing whether the coefficient of the dummy variable is statistically significant. More complex versions of this would use a panel regression with multiple dummy variables denoting different characteristics of the credit rating such as whether it's a downgrade or an upgrade and whether it is denoted in local or foreign currency. (Hooper, Hume and Kim, 2008)

[13] This model will be discussed further later on.

#### *2.1.1.3 Event studies combined with regression analysis*

Some papers employed both an event study and a regression in order to conjure a sturdier conclusion. Others used regressions in an attempt to discover whether certain variables affect the abnormal returns as predicted by the event study; for example the paper by Brooks, Faff, Hillier, and Hillier used dummy variables such as emerging market, CRA, and whether the up/downgrade was more than one step.[14]

### 2.1.2 The general consensus in the literature

With regards to the effects of corporate credit ratings on stock returns the predominant inference is that corporate rating changes do have an effect on stock returns, however the effect is not symmetrical as the response to downgrades is more significant compared to that of upgrades. (Gil Penha, 2015; Freitas and Minardi, 2013; Choy, Gray and Ragunathan, 2006)

As for the effects of sovereign ratings on stock returns; several papers concluded that sovereign downgrades are statistically significant whilst upgrades are not[15] (Brooks et al., 2004; Pukthuanthong-Le, Elayan and Rose, 2007; Klimavičienė, 2011; Paterson and Gauthier, 2013) whilst some papers (Hooper, Hume and Kim, 2008) concluded that both sovereign upgrades and downgrades have a statistically significant impact on stock returns.

Some of the papers discussed above test these effects in large stock markets in developed countries, the consequences of which is that the markets are much more liquid and able to react quickly to new information, which is not necessarily the case for a developing market such as the GCC.

## 2.2 Theoretical framework

### 2.2.1 The efficient market hypothesis

EMH plays a critical role in papers such as this one, as the market's reaction to new information is within the domain of EMH. This highlights two points with regards to this paper, first whether credit ratings actually carry new information and second whether the markets are efficient at all, both of

[14] This will be discussed further later on.
[15] Reflecting the same results determined by the papers testing corporate rating's effects on stock returns

which are interdependent on each other, this is referred to as the dual hypothesis issue The only to move forward with this research is to make the assumption that the market is not efficient.

### 2.2.2 Why does the stock market react to a change in the sovereign rating

The risk of a sovereign rating change leading to fluctuations in stock market returns can be explained by the following three reasons:

#### *2.2.2.1 Foreign currency restrictions*

A paper tested the correlation between sovereign and corporate ratings yielded results showing a positive correlation between the two, even after accounting for macroeconomic variables. (Borensztein, Cowan and Valenzuela, 2013) The researchers theorised that the result could be due to the reactions of a government in financial distress and hence the consequent restrictions usually imposed on foreign currency transactions; the paper argues that the default risk rises as private corporations are shackled by the foreign currency restrictions forcing them to default regardless of their capabilities to repay debt.

#### *2.2.2.2 Spill over*

When sovereigns default, the consequences are felt throughout their economies. For example, the private sector has to content with expropriation or "[the] risk of higher future taxation". (Ağca and Celasun, 2012, pp.204) This topic is discussed in greater details in papers testing the sovereign ceiling effect[16] (Durbin and Ng, 1999)

#### *2.2.2.3 Macroeconomic trends*

It is commonly known that when a sovereign debt crisis occurs it is a consequence of macro-economic trends such as a recession, therefore it is not inaccurate to suggest that these trends lead to issues in the private sector too. Researchers comparing sovereign crises with foreign credit available for private firms concluded that there is a systematic relationship between the two, even after the restructuring of sovereign debt. (Arteta and Hale, 2008)

[16] It is when corporations can't achieve credit ratings that are higher than their country's sovereign rating

### 2.2.3 Hypotheses

As per the objectives that were listed in the introduction, the following hypotheses are generated.

#### *2.2.3.1 Objective 1:*

*To quantitatively assess whether sovereign credit ratings changes have any influence on the stock market's returns.*

##### 2.2.3.1.1 Null hypothesis:

$H_0$: Sovereign ratings have no influence on stock market returns

##### 2.2.3.1.2 Alternative hypothesis:

$H_1$: Sovereign ratings have an influence on stock market returns

#### *2.2.3.2 Objective 2:*

*To assess whether the stock markets react differently for sovereign rating upgrades compared to downgrades.*

##### 2.2.3.2.1 Null hypothesis:

$H_0$: There is no difference in stock market reactions to a sovereign upgrade compared to a downgrade

##### 2.2.3.2.2 Alternative hypothesis:

$H_1$: There is a difference in stock market reactions to a sovereign upgrade compared to a downgrade

#### *2.2.3.3 Objective 3:*

*To assess whether the stock markets react differently for a change in the long term rating compared to a change in the short term sovereign rating*

##### 2.2.3.3.1 Null hypothesis:

$H_0$: There is no difference in stock market reactions to a long term change in the sovereign rating compared to a short term

#### 2.2.3.3.2 Alternative hypothesis:

$H_1$: There is a difference in stock market reactions to a long term change in the sovereign rating compared to a short term

### *2.2.3.4 Objective 4:*

*To assess whether stock markets react differently for a sovereign ratings change based on which CRA issued the rating*

#### 2.2.3.4.1 Null hypothesis:

$H_0$: There is no difference in stock market reactions based on which CRA issued the rating.

#### 2.2.3.4.2 Alternative hypothesis:

$H_1$: There is a difference in stock market reactions based on which CRA issued the rating

### *2.2.3.5 Objective 5:*

*To assess whether the stock markets react differently based on which country is being rated*

#### 2.2.3.5.1 Null hypothesis:

$H_0$: There is no difference in stock market reactions based on which country is being rated

#### 2.2.3.5.2 Alternative hypothesis:

$H_1$: There is a difference in stock market reactions based on which country is being rated

## 2.3 Previous Literature

A paper (Mai Nguyen and zu Knyphausen-Aufseß, 2014) accumulated a significant amount of relevant papers on the impact of sovereign ratings on corporations; therefore, it was a useful resource as it collected a substantial amount of previous research on this topic. The paper also highlights the deficiencies in the literature regarding this topic by arguing: “research on sovereign ratings has mainly focused on effects observed in sovereign and corporate bond markets” as opposed to sovereign ratings

and the stock markets this was discussed briefly in the introduction. (Mai Nguyen and zu Knyphausen-Aufseß, 2014, pp.147)

(Brooks et al., 2004) plays a significant role in this area of study as it is very comprehensive in terms of quality and sample size; the paper tests stock market reactions to changes in sovereign ratings in roughly sixty countries with a time period ranging from January 1973 to the end of July 2001. However, the paper's literature review briefly mentioned previous tests for the effects of sovereign ratings changes on stock markets.[17] The way Brooks et al tested the effects of sovereign rating changes was by using a simple event study in conjunction with cumulative standardised abnormal returns. Moreover, the writers also compared the different CRAs in order to determine if any particular CRA had a stronger effect on stock markets compared to the others. The paper ran a regression to ascertain the determinants of the abnormal returns calculated from the event study; the event window and estimation window chosen were (-10,+10) and (-120,-21)[18] respectively. The results showed that sovereign rating downgrades have a negative impact on stock market returns, whilst upgrades are insignificant. Moreover, the authors also noted that of the four CRAs tested S&P and Fitch ratings had the most significant impact on the stock market returns. Two things can be learnt from the Brooks paper, first: the authors concluded that sovereign rating downgrades are statistically significant regardless of whether the market is developed or developing; this suggests that the results of this thesis should mirror that of Brooks. Second, Brooks also concluded that the result does not change regardless of which currency the rating was in.[19] This is relevant because the GCC does not share a common currency; meaning that when running the GCC event study using each country's domestic currency sovereign rating should not have any influence on the results.

[17] This could be a consequence of the lack of previous literature at the time.
[18] 6 months
[19] Domestic currency vs. USD

A paper by Hooper, Hume and Kim –not dissimilar to the Brooks paper- tested the effects of sovereign rating changes on stock markets, however this paper only tested forty two countries as opposed to Brook's sixty. Moreover, these two papers also differ in testing periods as the Hooper paper's period is significantly smaller than the Brooks paper[20] however, a smaller period is not necessarily detrimental to the results, as it is generally accepted that the significance of credit ratings evolved over time hence the reactions from the 1970s are not applicable in the current financial climate. The paper not only tested for the reaction in stock markets, but also tested for reactions in foreign exchange markets. (Hooper, Hume and Kim, 2008) Hooper, Hume, and Kim forego traditional event study methodologies; replacing them with panel regressions exclusively. Simply put; instead of developing event studies and calculating abnormal returns and cumulative abnormal returns Hooper et al run a market model adding in a category variable which accounts for a rating change[21]. The model is then modified by adding another category variable, this is done in order to compare different characteristics such as local vs. foreign currency ratings and downgrades vs. upgrades and emerging vs. developed countries et cetera. The paper used an event window of (-1,+1). The paper concluded that stock markets have a significant reaction to changes in sovereign ratings, furthermore, it was concluded that a sovereign rating downgrade has a more "pronounced" effect on stock market return as opposed to upgrades. As for the effect of sovereign rating changes on foreign exchange markets; it was concluded that sovereign ratings do have a significant impact on foreign exchange markets. The Hooper paper not only introduced an alternative technique that can be used instead of a traditional event study but also tested for the effects of sovereign ratings on foreign exchange markets. However, Hooper employed an event window of (-1,+1) which could be seen as a weakness as it is not wide enough to account for any leakages or slow reactions. As for testing for the sovereign ratings effect on foreign exchange, this thesis simply can't as all GCC members employ fixed exchange rate policy locking local currencies with the US Dollar[22].

[20] (1995-2003) compared to (1973-2001)
[21] If upgrade then =1 if downgrade =-1 if two notch upgrade =2 and so on.
[22] Kuwait uses an undisclosed basket of currencies

Pukthuanthong-Le, Elayan and Rose tested for the reactions of both stock markets and bond markets to changes in the sovereign debt ratings. This paper used a pool of thirty four countries with a period not dissimilar to that of the Hooper paper (1990-2000). However, this paper differs in the fact that it not only tested for changes in ratings but also in outlooks and credit watch placements. (Pukthuanthong-Le, Elayan and Rose, 2007)The methodology of this paper is similar to that of Brooks; in that an event study is used to calculate abnormal returns[23] and then a panel regression is used to ascertain which variables determine said abnormal returns. With regards to the event study, rather than using a single event window the authors decided to use multiple windows and to show which ones are statistically significant and which one are not[24]. The paper concluded that only sovereign rating downgrades have a statistically significant impact on equity returns. With regards to the effect of sovereign ratings on government bonds; downgrades have a statistically significant effect on government bond returns whilst upgrades have an insignificant impact, echoing the conclusions drawn from equity returns. The Pukthuanthong-Le paper's conclusions are similar to that of the Brooks and Hooper papers; that is: sovereign downgrades have a more pronounced effect on stock market returns, however this paper also tested the bond market and concluded that the bond market and stock market's reactions are not dissimilar. The most significant deviation this paper had compared to the ones discussed earlier was that it tested and showed the results for multiple event windows rather than simply choosing one clandestinely.

Asta Klimavičienė tested for the effects of sovereign ratings on stock markets; the research was conducted in three Baltic stock markets[25] using event study methodology. (Klimavičienė, 2011)The paper used multiple event windows, in an attempt to gauge whether the stock markets anticipate changes in the sovereign ratings before the event or react slowly after the event. The event windows used range from (-20,+10)The paper's a priori expectation was that there will be an asymmetrical reaction with sovereign rating downgrades having a stronger impact on the stock market as opposed to

[23] And cumulative abnormal returns, and the averages of both etc.
[24] See Table 2 (Pukthuanthong-Le, Elayan and Rose, 2007)
[25] Estonia, Latvia, and Lithuania.

upgrades: this is confirmed as "the price impact of negative events is several times larger than that of positive events." (Klimavičienė, 2011, pp.51) Klimavičienė also concluded that whilst some rating announcements are anticipated the reaction is strongest on the announcement/event day. The Klimavičienė paper is important due to the fact that its sample size is significantly smaller than the papers discussed earlier; this is relevant as this thesis also has a relatively small sample size. Klimavičienė overcame this issue by simply aggregating all sovereign rating events[26] into two categories positive and negative events.

Alexander Paterson and Delphine Gauthier tested for the influence of sovereign ratings on several countries using an event study, the writers chose both a four day event window (-2,+1) and a six day event window (-3+2). They compared their results from GIIPS countries vs. BRIC countries. The period chosen was during a crisis in order to gauge whether the crisis had any influence on the stock market's reactions. (Paterson and Gauthier, 2013) The paper concluded that influence of sovereign ratings on stock markets diminished throughout the crisis. Moreover, it concluded like several papers earlier that negative events have a statistically significant effect whereas positive ones are statistically insignificant. Furthermore, the paper also determined that announcements from S&P carry more weight as opposed to other CRAs and that the size of the economy rated determines the reaction in the stock market, with reactions being stronger for smaller economies as opposed to large ones. Comparing the paper to the literature discussed earlier highlights that the periods chosen in previous research were arbitrary as opposed to this paper where it was chosen in order to test the effects of sovereign ratings during a crisis period and how the reactions evolve as the crisis slowly dies out. Whilst testing for the effects and their evolution during a crisis is an interesting topic it would be very difficult if not downright impossible in the GCC region; as the sample size would be miniscule compared to that of BRIC and GIIPS countries.

[26] Including reviews and credit rating changes

Rodolfo Martell tested for the sovereign ratings influence on stock markets in twenty nine emerging/developing countries using event studies. However, Martell went one step further and also tested for the effect of sovereign rating changes on the abnormal returns from 1,281 relevant firms rather than testing the effect on indices. (Martell, 2005) The paper used an event window of 11 days (-5,+5). The paper also used regression analysis to test for the determinants of the cumulative abnormal returns[27]. The paper concluded that the emerging stock markets only react to sovereign rating downgrades, and that S&P credit rating announcements carry more weight as opposed to Moody's. The paper also added that "firms located in richer countries and in countries with more developed financial markets experience smaller stock price reductions following a downgrade of their host government."[28] (Martell, 2005, pp.30) Moreover, larger firms are more sensitive to sovereign downgrades compared to smaller firms.

A recently published paper tested the influence of sovereign rating changes on bank stock returns in the Eurozone. (Hu, 2017) The period chosen was 2004-2013. It tested for this using event study methodology in conjunction with regression analysis to find the determinants of cumulative abnormal returns. Whilst this paper does not test for a reaction in the entire stock market, it is still relevant to the literature as its methodology and conclusions are still applicable to this research. Hu used six event windows with the widest being (-5,+5): Hu explains that this event window is chosen as to eliminate bank-related confound events. This step can be ignored when testing for reaction in an index rather than a single stock as in an index the events average out. Hu used long term sovereign foreign currency ratings exclusively. The paper concludes with the familiar result that sovereign downgrades lead to a fall in –domestic banks- share prices whilst sovereign upgrades and positive events have no discernable impact on share prices.

[27] Not unlike the Brooks paper

[28] This was discovered using regression analysis

The only paper testing the effects of sovereign ratings on stock markets in the GCC is the paper by Abdeldayem and Nekhili. (Abdeldayem and Nekhili, 2016) The time period chosen began in January 2014 and ended in March 2016. The paper made use of an event study not dissimilar to the methods used in the papers mentioned earlier. The paper employed an event window of (-20,+20), the estimation window is not specified in the paper. The final results show that sovereign ratings downgrades have a statistically significant impact on the Bahraini stock market particularly in the long term. Abdeldayen and Nekhili's paper has two glaring issues, the first is that it only tested one country therefore; its sample size is questionable. The other is that this paper only tested for whether downgrades are statistically significant, completely omitting upgrades[29].

## 2.4 Conclusions drawn from previous literature

Several conclusions can be made after combing through the previous literature. First and foremost is that the period chosen to conduct the study are significant, particularly if there is a crisis as was demonstrated by (Paterson and Gauthier, 2013) during a crisis the effects of sovereign ratings are amplified and as the crisis wanes, the effects also decline.

Second, the literature (Hooper, Hume and Kim, 2008; Brooks et al., 2004) testing emerging/developing vs. developed markets confirm that reactions from both are the similar; validating the assumption that the literature is still relevant to this case regardless of whether the research was conducted in a developing or a developed country.

Of the seven papers discussed above, only one (Hooper, Hume and Kim, 2008) deviated from the time tested event study methodology; however the paper still made use of the foundations of the event study techniques such as the market model in its regression based research methodology.

[29] Whilst this could be a consequence of using one country, it is nonetheless a significant issue.

Regression analysis was also prevalent in the literature as a tool for determining which variables or characteristics influence the cumulative abnormal returns calculated from the event study/market model, allowing for hypothesis testing and multiple conclusions to be drawn.

### 2.4.1 Expectations of results

1. To quantitatively assess whether sovereign credit ratings changes have any influence on the stock market's returns.
2. To assess whether the stock markets react differently for sovereign rating upgrades compared to downgrades.
3. To assess whether the stock markets react differently for a change in the long term rating compared to a change in the short term rating
4. To assess whether stock markets react differently for a sovereign ratings change based on which CRA issued the rating
5. To assess whether the stock markets react differently based on which country is being rated

After reviewing the previous literature, the objectives can be matched with hypotheses using educated guesses derived from the literature.

With regards to the first objective, the literature clearly points out that there will be an influence on the stock market's return. As for the second objective, the reactions should be asymmetric with negative sovereign events/ratings having more of an influence on stock markets, as was the case with the majority of the literature. The third objective was not tested in the previous literature and therefore no further inference can be made. As for the fourth objective, (Brooks et al, 2004) concluded that S&P and Fitch sovereign ratings have the strongest impact on stock markets. Moreover, (Paterson and Gauthier, 2013) concluded that S&P sovereign ratings have the strongest impact on stock markets[30]. The final objective tests for the differences between GCC countries, as there are no other papers testing this effect in the GCC as a whole; no inference can be drawn from previous literature.

[30] In the Baltic stock market.

The previous literature was enlightening; particularly as to how each paper differs in its event windows and how it employed regression analysis. There are several points that were observed in the previous literature's methodology that this thesis will use carrying forward.[31] Moreover, the literature review was useful as the information gained allowed for the reappraisal of the objectives of this paper and hence for the establishment of realistic hypotheses for said objectives based on the results from similar papers.

[31] To be discussed in the methodology chapter

# 3 CHAPTER THREE: Methodology

## 3.1 Introduction

It was observed in the literature review that the majority of papers testing the influences of credit ratings[32] on stock prices used event studies; some papers complemented their event studies with regressions to test for the determinants of the abnormal returns detected via the event studies.

Therefore, moving forward; this thesis will follow the example of the previous literature and make use of event studies. As for the regression analysis; due to the small sample size a regression analysis would not be viable for this thesis.

The majority of previous papers simply chose an event window; this thesis –following the example of (Pukthuanthong-Le, Elayan and Rose, 2007) - will test multiple event windows demonstrating whether each one was statistically significant or not, both average abnormal returns and cumulative abnormal returns will be tested[33] (AARs and CARs respectively)

## 3.2 Assumptions of the study

Some of these assumptions were glossed over earlier, however now they will be explained and discussed in detail:

### 3.2.1 The returns of the stock market can be explained via a market model

This is a strong assumption that is rarely discussed in the previous literature; a side effect of this assumption is the rejection of market efficiency as was discussed earlier.

The simplest way to explain an event study is by saying: an event study is a method used to determine if an event lead to a change in stock prices. Whilst that is a gross overstatement it is nonetheless accurate. The difficulty of an event study is in determining whether price changes are a consequence of the event being tested, rather than random fluctuations.

[32] Sovereign or otherwise

[33] How AARs and CAARs are calculated will be shown and discussed later

In order for researchers to filter out unwanted price fluctuations, they must create a model that accounts for these movements; a model to estimate a stock market's expected return ignoring the event being tested. In this paper the model chosen is a market model based on a relevant benchmark[34] following the methods used by (Brooks et al, 2004; Pukthuanthong-Le, Elayan and Rose, 2007)[35]

With a model created to estimates the markets' normal return, the researchers can then superimpose the actual return during the event window and calculate any abnormal returns caused by the event; the abnormal returns can then be used to conduct hypothesis tests.

The reason this assumption has to be made is because without it an event study cannot be conducted since there will be no background reference by which to compare prices. However, whilst this assumption has to be made it does not necessitate the use of a market model, for example an ARMA/ARIMA, or APT model can also be used so long as it is accurate and statistically significant. However, as mentioned by (MacKinlay, 1997,pp.18): "Generally, the gains from employing multifactor models for event studies are limited." Explaining that each extra factor has less explanatory power and hence the reduction in errors is not worth the extra complications.

### 3.2.2 First time ratings will be treated as upgrades

Whilst some of the previous literature tested first time ratings independently this thesis does not have the luxury as the sample size is so small that all inference attempted using only first ratings will fail any significance tests due to the sample size.

The consequences of this assumption should be insignificant, as to most investors view an unrated entity that later becomes rated as an 'upgrade'. Moreover, first time ratings occur so early in the sample period that most of the first time rating events lack the associated historical benchmark or index data.

Another solution to this issue is to simply ignore all first time ratings and move on with the research. However, as was mentioned numerous times in this paper; the sample size of this paper is the most

[34] The exact benchmark used will be mentioned later
[35] And numerous other papers discussed in the literature review.

difficult obstacle to overcome and simply discarding precious observations would compound the issue.

### 3.2.3 No distinctions will be made for multi-level rating changes

Multiple level rating changes is when a rating is upgraded or downgraded in a manner that allows it to entirely skip over a rating category.[36] The literature review showed that only one paper (Hooper, Hume and Kim, 2008) made the distinction between multi-level ratings changes and single level changes.

This assumption was made because separating the data into single vs. multi-level changes and then testing each will complicate matters unnecessarily; moreover, it would also make hypothesis testing difficult as it cuts into the sample size.

Not dissimilar to the assumption 'that first time ratings will be treated as upgrades' multi-level rating changes can simply be discarded however as mentioned earlier discarding data would adversely affect the strength of the inference within this paper.

## 3.3 Event study method

As was discussed earlier, an event study with underlying market model will be used for this thesis.

### 3.3.1 The market model

A market model estimates a relationship between the market's return and a benchmark's return using an ordinary least squares regression, thereafter, the model can be used to infer the market's return given the benchmark's return at any point in time.

Market model formula:

$$R_{it} = \beta_0 + \beta_1 R_{bmt} + \epsilon_{it}$$

Where, $R_{it}$ is the return on the stock market index i at time t and where $R_{bmt}$ is the return on the benchmark at time t, leaving $\epsilon_{it}$ as the error term.

[36] Such as for example a rating change from BB to A

The benchmark chosen for this paper is the MSCI Gulf Cooperation Council (GCC) Countries Investable Market United States Dollar index, the reason this benchmark was chosen is because the alternatives did not have any price data before 2004 which is unacceptable as many of the credit events occur before 2004, however, this index begins on 31/05/2002 which is not ideal as some data points will have to be discarded but it is the most appropriate and historically comprehensive benchmark available for the GCC.

#### *3.3.1.1 The estimation period*

The estimation windows used in previous literature varied, however based on the two most popular papers in the literature (Brooks et al, 2004; Pukthuanthong-Le, Elayan and Rose, 2007) with an estimation window of 100 and 130 days respectively. Therefore a relatively similar estimation period of 100 days[37] will be used.

#### *3.3.1.2 The event window*

This is the window that encompasses the event day; it attempts to take into account any reactions before the event and any late reactions after it. Observing the previous literature shows that Brooks used an even window of (-10,+10). Other researchers tested for windows that only cover reactions before or reactions after the event such as for example (Pukthuanthong-Le, Elayan and Rose, 2007) who used event windows of (-45,-2) and (+2,+45) testing for information leakage and late reactions respectively, this is not part of this thesis's objectives therefore it will not be tested.

As for the size of the event windows in this thesis, following on the Brooks ,Pukthuanthong-Le, and Hooper papers the largest event window was (-10,+10) from Brooks. Both Pukthaunthong-Le and Hooper used windows that are within the (-10,+10) boundary, therefore this thesis will also use a maximum event window of (-10,+10) whilst also testing smaller windows such as the (-1,+1),(-3,+3), and the(-5,+5) windows. Note that some events occur on days where the market is not open, in such cases the 'event day' will be the next available trading day.

[37] Therefore it will be (-11,-110), 100 was chosen over 130 due to the availability of historic data for some ratings.

### 3.3.2 Computing abnormal returns

After estimating the market model, it would now be possible to use the model to estimate normal returns, and hence infer the abnormal returns using the following formula:

$$\widehat{AR}_{it} = R_{it} - (\hat{\beta}_0 + \hat{\beta}_1 R_{bmt})$$

Where $\widehat{AR}_{it}$ is the difference between the actual return on a national stock index at time t and the expected return as dictated by the market model that was estimated earlier.

#### *3.3.2.1 Average abnormal return*

The AAR is a simple cross sectional aggregation metric that averages out the AR[38] "over each day in the event period" (Brooks et al, 2004, pp.239) Therefore, if the event window is (-10,+10) there will be twenty one different AAR statistics; one for each day in the event window.[39]

$$AAR_t = \frac{1}{I}\sum_{T}^{I} \widehat{AR}_{it}$$

#### *3.3.2.2 Cumulative abnormal returns*

CAR is the simplest calculation in an event study; it takes the abnormal returns and sums them. It is useful in some hypothesis tests such as when calculating the standard deviation of the CAAR[40]

$$CAR_{T_1,T_2,i} = \sum_{T}^{I} \widehat{AR}_{it}$$

#### *3.3.2.3 Cumulative average abnormal return*

Whilst the AAR separated the data cross sectional the CAAR will go one step further averaging the data both cross sectionally and over time. The CAAR builds on the AAR by taking the sum of AARs

[38] From all the relevant rating events
[39] There will be 21 AARs for one characteristic (say upgrades) and 21 AARs for the other (say downgrades)
[40] Which is required for some hypothesis tests

over the event period; this transforms the twenty one numbers from earlier into a single number for each characteristic.

$$CAAR_{T_1T_2} = \sum_{t=T_1}^{T_2} AAR_t$$

Where: the event window is ($-T_1$ ,$+T_2$)

### 3.3.3 Significance testing

The next step after calculating the AAR and CAARs is to run hypothesis tests in order to test for the significance of said AARs and CAARs. There are several methods to conduct significance testing in event studies, the simplest of which is the traditional T test.

$$t_{AR_{i,t}} = \frac{AR_{i,t}}{S_{AR_i}},$$

$$t_{CAR} = \frac{CAR_i}{S_{CAR}},$$

$t_{AAR_t} = \sqrt{N}\frac{AAR_t}{S_{AAR_t}},$

$$t_{CAAR_t} = \sqrt{N}\frac{CAAR_t}{S_{CAAR_t}}$$

Where: $S_{AR}$, $S_{CAR}$, $S_{AAR\ t,}$ and $S_{CAAR\ t}$ are the standard deviations of the AR, CAR, AAR, and CAAR respectively.

Where: $H_0$: AR=0, $H_0$: CAR=0, $H_0$: AAR=0, and $H_0$: CAAR=0 respectively

However, testing for significance in AR will be counterproductive as it is a disaggregated metric meaning it will require the testing of each credit rating event independently; therefore AR testing would be discarded in favour of the easier and quicker tests for CARs, AARs, and CAARs.

## 3.4 Data

The historic sovereign ratings data in this thesis was collected using the Thomson Reuters DataStream database. The data spans a period beginning in late 1997 and ending in late 2017; the reason this period is chosen is simply because this period spans all the available credit events that are available on Thomson DataStream for the GCC. The total number of credit events during the period is 103, of which 47 are issued by S&P, 38 by Moody's, 18 by Fitch. All the credit ratings in this study are of the domestic currency variety. Of the 103 ratings, 59 are upgrades[41] and 44 are downgrades.

Table 1: Number of Ratings

| | S&P LT | S&P ST | **S&P Total** | Moody's LT | **Moody's Total** | Fitch LT | **Fitch Total** | **Total** |
|---|---|---|---|---|---|---|---|---|
| **Saudi** | 4 | 4 | **8** | 6 | **6** | 6 | **6** | **20** |
| **Oman** | 9 | 5 | **14** | 8 | **8** | 2 | **2** | **24** |
| **Qatar** | 7 | 2 | **9** | 6 | **6** | 2 | **2** | **17** |
| **Bahrain** | 7 | 6 | **13** | 11 | **11** | 7 | **7** | **31** |
| **Kuwait** | 3 | 0 | **3** | 3 | **3** | 1 | **1** | **7** |
| **UAE** | 0 | 0 | **0** | 4 | **4** | 0 | **0** | **4** |
| Total | 30 | 17 | **47** | 38 | **38** | 18 | **18** | **103** |

**Table 2: Upgrade vs. Downgrades**

| | **Upgrades** | | | | **Downgrades** | | | |
|---|---|---|---|---|---|---|---|---|
| | S&P | Moody's | Fitch | **Total** | S&P | Moody's | Fitch | **Total** |
| **Saudi** | 4 | 5 | 4 | **13** | 4 | 1 | 2 | **7** |
| **Oman** | 6 | 5 | 1 | **12** | 8 | 3 | 1 | **12** |
| **Qatar** | 7 | 5 | 1 | **13** | 2 | 1 | 1 | **4** |
| **Bahrain** | 3 | 4 | 3 | **10** | 10 | 7 | 4 | **21** |
| **Kuwait** | 3 | 3 | 1 | **7** | 0 | 0 | 0 | **0** |
| **UAE** | 0 | 4 | 0 | **4** | 0 | 0 | 0 | **0** |
| **Totals** | **23** | **26** | **10** | **59** | **24** | **12** | **8** | **44** |

### 3.4.1 How the data will be used to achieve the objectives of this paper

The five objectives of this paper are, first to test whether stock markets react if there is a change in sovereign ratings. Second, to test whether there is any difference in the reactions between a rating upgrade or a ratings downgrade, third to test whether reactions are the same for short term sovereign rating changes compared to long term rating changes. Fourth, to test for whether the market reacts

[41] Accounting for the assumption that first time ratings are seen as 'upgrades'

differently based on which CRA issued the ratings. Fifth, to test for whether there is a difference based on which GCC country is being re-rated.

#### *3.4.1.1 Objective 1 & 2*

The test for the first and second objectives will be combined, as, if there is a reaction for an upgrade or downgrade then the first objective is already fulfilled.

To test for the second objective the data first has to be separated into upgrades and downgrades, then ARs, AARs, CAARs will be computed for upgrades and downgrades independently, after which significance testing will be conducted to test which of the two are significant, if any.

#### *3.4.1.2 Objective 3*

As for the third objective shown in Table 1: Number of Ratings; short term data is only available from S&P, and with only 17 short term ratings available it would be difficult to test this whilst ensuring the data remains significant. Nonetheless this comparison will also be attempted.

The only way to conduct this test is to use S&P data exclusively; therefore all other data will be discarded. After which the S&P data must be separated based on whether they are short term or long term ratings, after that the ARs, AARs, CARs, and CAARs can be calculated and tested for significance.

#### *3.4.1.3 Objective 4*

The first step in testing which CRA has the strongest influence on the stock markets is to discard the S&P short term data as it could skew the results[42], thereafter the data will be separated based on the CRA, then further separated based on whether the events are upgrades or downgrades. After which the ARs, CARs, AARs, and CAARs can be calculated and tested for significance.

#### *3.4.1.4 Objective 5*

The final test to be conducted would be the test for which GCC country is most sensitive to sovereign rating changes, and whether there is a difference across GCC countries in their reactions to rating

[42] This is done because S&P is the only CRA that provides short term data, the remainder of the data is Long term

changes. This test is conducted by separating the ARs based on country and then separating them further based on upgrades or downgrades, thereafter, the AARs, CARs, and CAARs can be calculated and tested for significance.

## 3.5 Conclusion

After reviewing the data available the small sample size issue crops up again, whilst it is not going to be a problem for objectives 1, 2 and 4, 5. Objective 3 would be very difficult to test because of the very small sample size; it would not be irrational to assume that the significance tests for objective 3 will fail due to the miniscule sample size.

# 4 CHAPTER FOUR: Findings and Analysis

## 4.1 Introduction

This chapter will showcase the results and the tests conducted for each objective, moreover, the results will be tested for significance using the methods that were described in the methodology.

## 4.2 The market model

Two issues arose when running the regressions for the market model, the biggest of which was the availability of historic data, as mentioned earlier, the MSCI GCC Investable Market United States Dollar index is to be used as the benchmark.[43] However, the historic prices for the index began in June of 2002, therefore, several credit rating events have to be discarded to accommodate; out of the 103 sovereign rating events 20[44] have to be discarded[45] leaving 83 events to be tested.

The second issue was that some market models were insignificant[46]. The explanation for this is simple and unavoidable; as during each estimation windows there were several days where prices do not fluctuate, this is a consequence of the illiquid markets of the GCC. As such, there is not enough price return data for some models to be significant.[47] This issue would have been a problem for previous researchers such as (Brooks et al, 2004 & Pukthuanthong-Le, Elayan and Rose, 2007) however, both papers did not show nor explain the regression results of their market models, electing to move on to calculating the ARs and CARs and such.

## 4.3 Objective 1 and 2

### 4.3.1 Abnormal Returns

As mentioned earlier in the methodology there are several versions of abnormal returns that are typically employed in event studies; ranging from AR, CAR, AAR, and CAAR. This paper calculated

[43] It was chosen mainly because of it has the longest price history of any GCC index that is available on Thomson Reuters's DataStream.
[44] Note that some of the events that were discarded were discarded because the actual country index did not have historic data that old, rather than the benchmark used in the market model
[45] As the events occurred before pricing information was available
[46] 30 out of the 83 models were insignificant w at an alpha of at least 10%
[47] Regardless of whether the model is significant or not the AR can still be calculated.

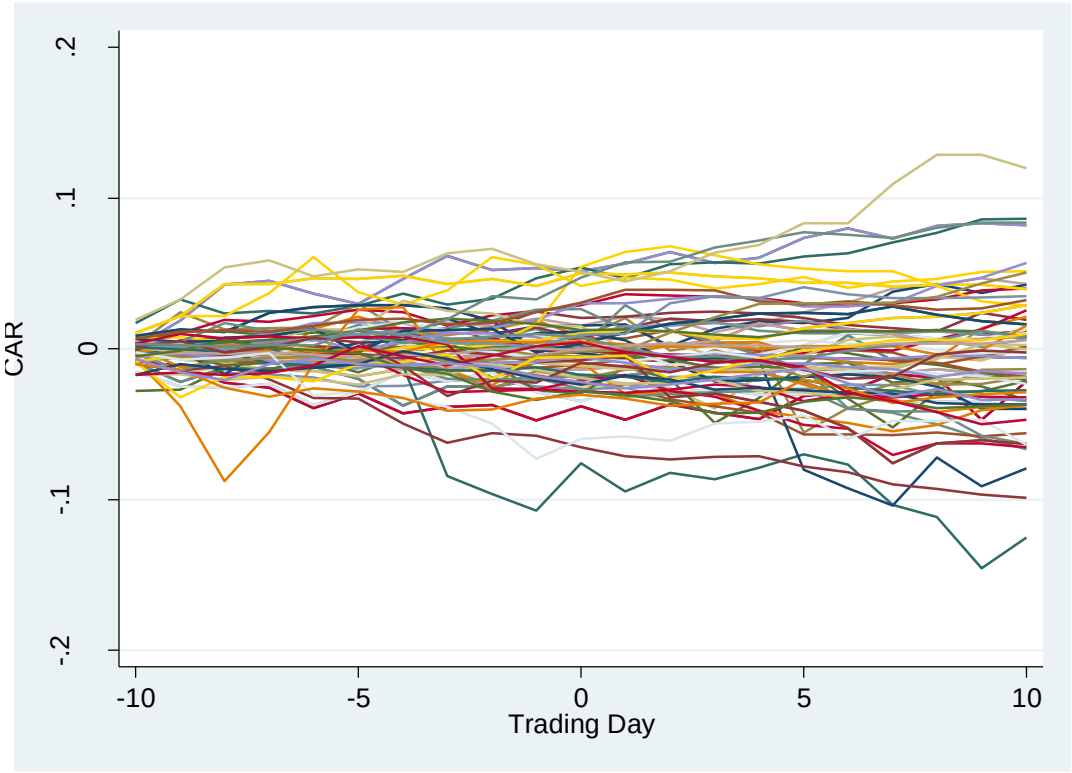
all of these metrics, however the significance tests will only be conducted on the CARs, AARs, and CAARs in line with the (Brooks et al, 2004) methodology.

The most difficult aspect of conducting these tests is separating the vast number of events based on what characteristics are to be tested; be it upgrades v. downgrades, or based on CRA, or ST v. LT, or country. However the first step is simply to calculate the abnormal returns for all the events. As such:

**Figure 1: Aggregated AR**


The figure above shows the abnormal returns for all 83 events over the (–10,+10) event period. This figure is a chaotic mess with no discernable patterns; perhaps the aggregate CAR would show a trend:

**Figure 2: Aggregated CAR**




Not dissimilar to Figure 1 earlier, this graph is also inconclusive. The next step is separating the ARs/CARs based on upgrade or downgrades yields the following:

**Figure 3: Upgrades AR**

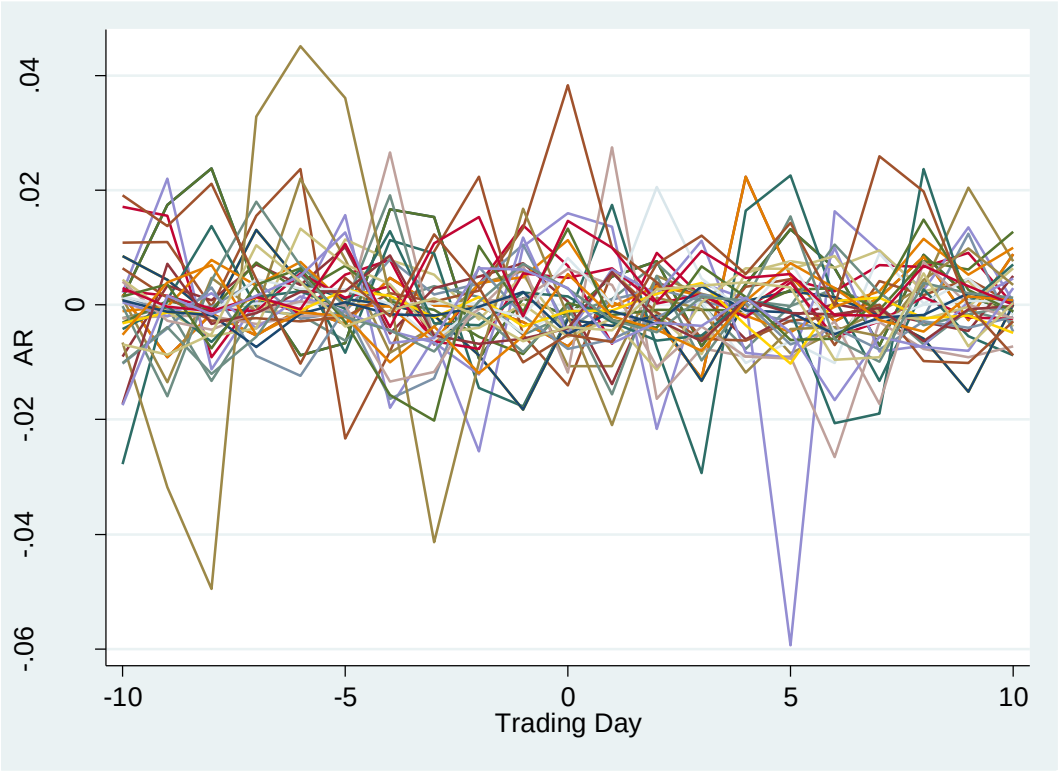
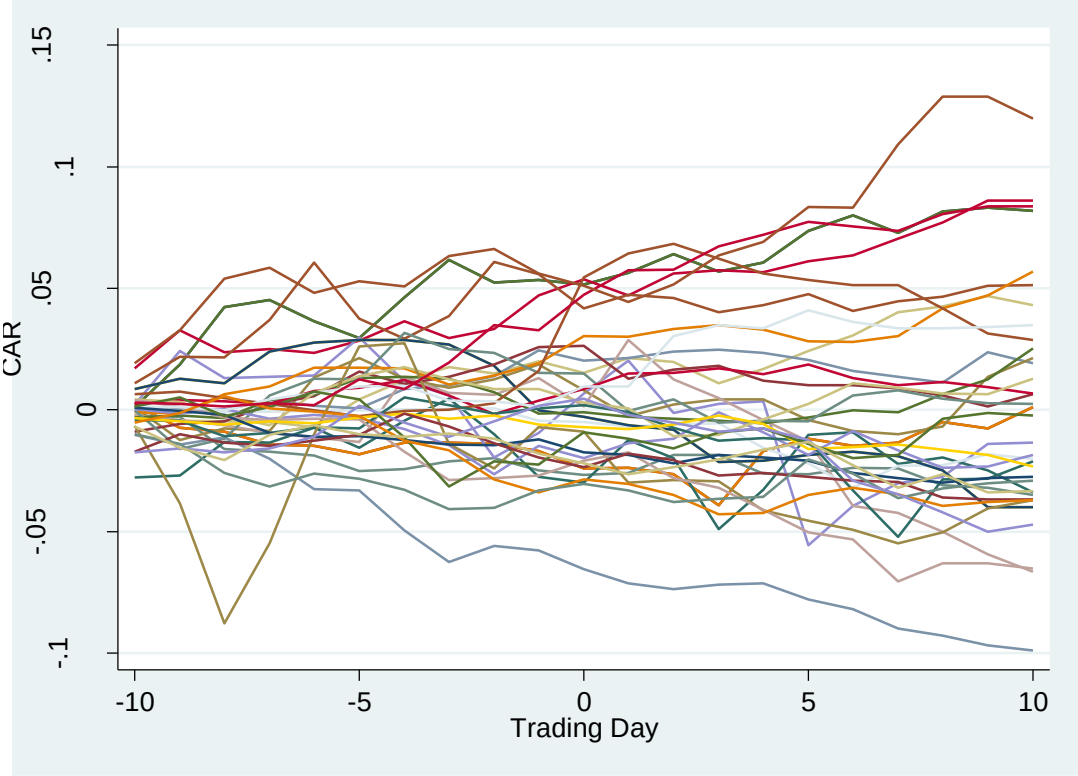



**Figure 4: Upgrades CAR**

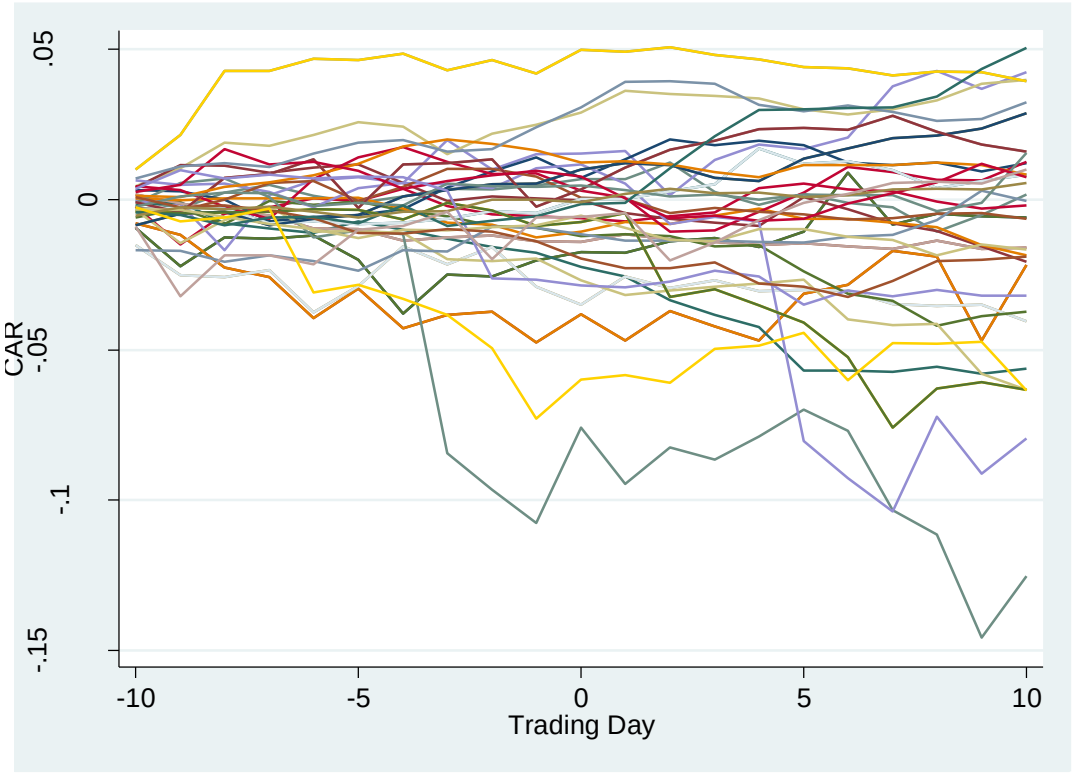


Even after separating out the downgrades, the ARs show no discernable patterns, however the CARs do show a weak upwards trend which is mostly visible after the event day, this highlights the fact that prices could trend upwards after an upgrade.

As for the downgrades:

**Figure 5: Downgrades AR**

**Figure 6: Downgrades CAR**




The ARs for downgrades show no discernable trend, however the graph showing the CARs shows a significant downwards trend after the event date, some of the markets seem to react days before the actual event.

Whilst the graphs showing the ARs and CARs can help to discern simple trends, to have any chance of finding robust patterns in the data the AARs and aggregated CARs must be observed, as such:

**Figure 7: Upgrades AARs & CARs**

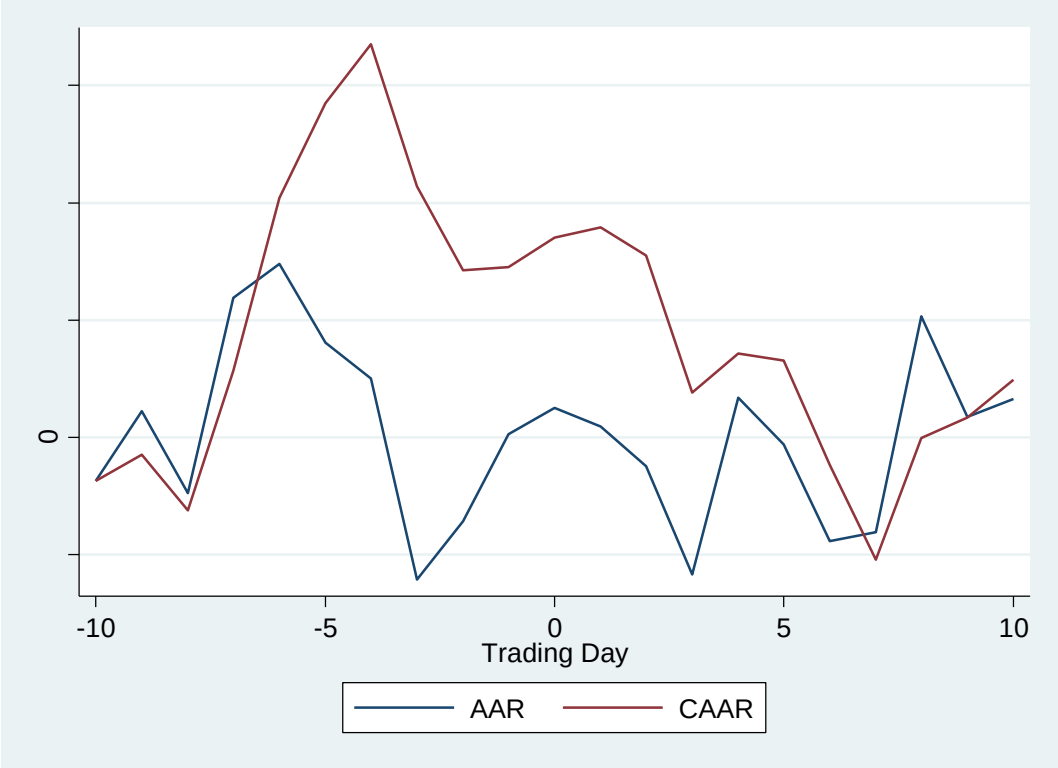
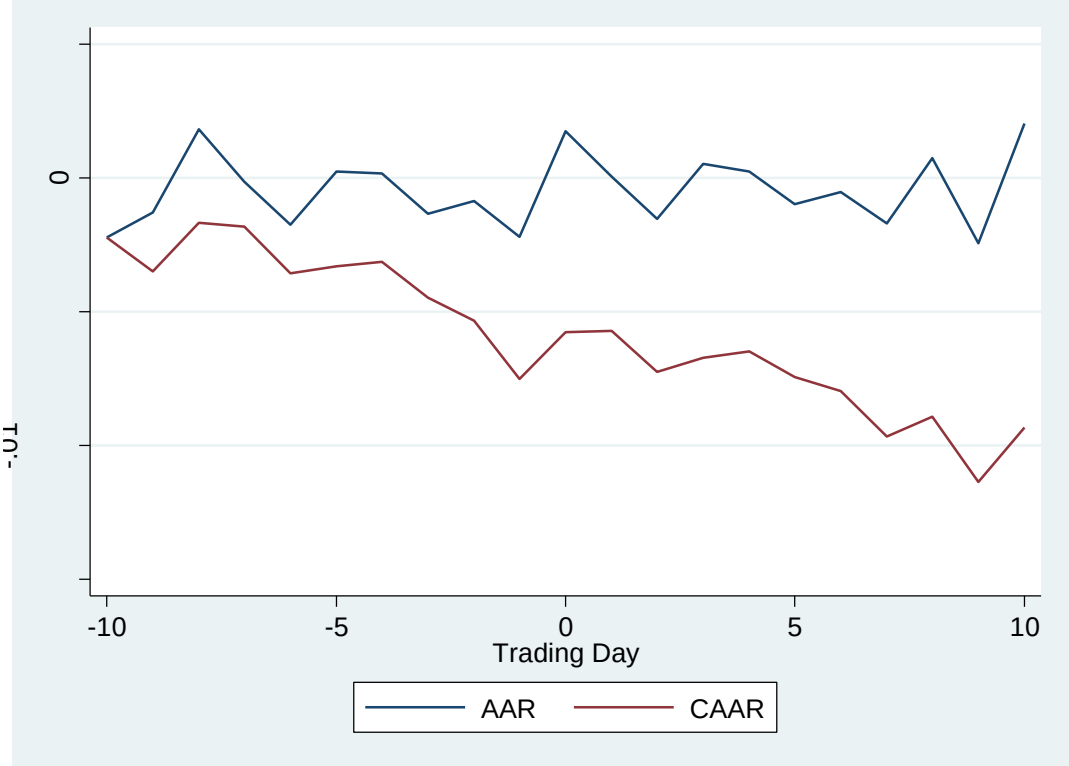



**Figure 8: Downgrades AARs & CARs**



The two figures above simply average all the data seen in the figures earlier, allowing for a better glimpse at the results. Observing Figure 7 -for upgrades- shows no real trend, yet, if one looks at the event day a positive hump can be distinguished; highlighting the fact that the market could be reacting to the 'good news' of an upgrade around the event day.

The downgrades' AARs and CARs (Figure 8) do show a trend, highlighted by the CAR which appears to be falling throughout the event period, however note that on the actual event day the ARs and CARs do rise, which is peculiar, though it could be explained by the market correcting for the overreaction that occurred before the event.

### 4.3.2 Significance testing

The most important part of this paper is the significance testing of the ARs and CARs, as such following the (Brooks et al, 2004) method to compare upgrades and downgrades yields the following results[48]:

[48] The method by which the T-stat was calculated is based on the (Brown and Warner, 1985) paper

#### *4.3.2.1 AARs*

**Table 3: AARs Upgrades v. Downgrades[49]**

| | Upgrades | | | Downgrades | | |
|---|---|---|---|---|---|---|
| Trading Day | AAR | T-stat | P-value | AAR | T-stat | P-value |
| -10 | -0.07% | -0.54 | 59.06% | -0.22% | **-2.39**** | 2.12% |
| -9 | 0.04% | 0.29 | 77.22% | -0.13% | -1.28 | 20.55% |
| -8 | -0.09% | -0.52 | 60.69% | 0.18% | 1.60 | 11.58% |
| -7 | 0.24% | **1.90*** | 6.46% | -0.01% | -0.22 | 82.90% |
| -6 | 0.30% | **1.89*** | 6.55% | -0.18% | -1.66 | 10.45% |
| -5 | 0.16% | 1.15 | 25.65% | 0.03% | 0.29 | 77.04% |
| -4 | 0.10% | 0.65 | 51.94% | 0.02% | 0.15 | 88.31% |
| -3 | -0.24% | -1.55 | 12.81% | -0.13% | -0.71 | 48.24% |
| -2 | -0.14% | -1.07 | 28.98% | -0.09% | -0.89 | 38.03% |
| -1 | 0.01% | 0.04 | 96.97% | -0.22% | **-2.09**** | 4.21% |
| 0 | 0.05% | 0.34 | 73.49% | 0.18% | **1.72*** | 9.19% |
| 1 | 0.02% | 0.13 | 89.56% | 0.00% | 0.06 | 95.22% |
| 2 | -0.05% | -0.42 | 67.38% | -0.15% | -1.20 | 23.69% |
| 3 | -0.23% | **-1.87*** | 6.93% | 0.05% | 0.83 | 41.21% |
| 4 | 0.07% | 0.58 | 56.60% | 0.02% | 0.35 | 72.80% |
| 5 | -0.01% | -0.06 | 94.98% | -0.10% | -0.51 | 61.26% |
| 6 | -0.18% | -1.39 | 17.29% | -0.05% | -0.52 | 60.76% |
| 7 | -0.16% | -1.32 | 19.40% | -0.17% | -1.27 | 20.91% |
| 8 | 0.21% | **1.71*** | 9.52% | 0.07% | 0.73 | 46.82% |
| 9 | 0.03% | 0.31 | 75.90% | -0.24% | **-1.76*** | 8.51% |
| 10 | 0.07% | 0.84 | 40.82% | 0.20% | **1.70*** | 9.69% |

##### 4.3.2.1.1 Upgrades

Examining the upgrades on Table 3 show several statistically significant changes on trading days -7, -6, 3, and 8 respectively. However these reactions are only significant at a 10% level. Therefore any inference generated from them should be taken with a grain of salt. An explanation for these reactions could be that on trading day -7 and -6 the markets speculate that there will be a sovereign upgrade and hence the stock market's prices rise (as demonstrated in the AAR), after reaching this new equilibrium no other reactions are warranted, even on the event day, however, after the event on day 3

[49] *Denotes a significance at the 10% level

** Denotes a significance at the 5% level

*** Denotes a significance at the 1% level

there is a statistically significant decrease in stock market prices, alluding to a market correction due to the overreactions on day -7 and -6. As for day 8 it can be simply explained away as an anomaly.

#### 4.3.2.1.2 Downgrades

As for the downgrades, the AARs show five statistically significant reactions in total, two of which are significant at a 5% level. The most relevant reactions are those that occurred on day -1 and 0. On trading day -1 there is a strongly negative and statistically significant reaction that can be interpreted as a last minute effort for the stock markets to react before the event, however, quite unexpectedly, on the actual event day the reaction is a positive and statistically significant, implying that perhaps the market is compensating for a gross overreaction on the day before. The other reactions in the downgrades' AARs can also be seen as anomalies or reactions to external events.

### *4.3.2.2 CARs*

**Table 4: CARs Upgrades v. Downgrades**

| | Upgrades | | | Downgrades | | |
|---|---|---|---|---|---|---|
| Trading Day | CAR | T-stat | P-value | CAR | T-stat | P-value |
| -10 | -0.07% | -0.54 | 59.06% | -0.22% | **-2.39**** | 1.99% |
| -9 | -0.03% | -0.13 | 89.81% | -0.35% | **-2.06**** | 4.33% |
| -8 | -0.12% | -0.36 | 72.20% | -0.17% | -0.77 | 44.20% |
| -7 | 0.11% | 0.33 | 73.97% | -0.18% | -0.84 | 39.73% |
| -6 | 0.41% | 1.32 | 19.55% | -0.36% | -1.29 | 19.95% |
| -5 | 0.57% | **1.83*** | 7.44% | -0.33% | -1.29 | 19.72% |
| -4 | 0.67% | **1.94*** | 5.99% | -0.31% | -1.08 | 28.05% |
| -3 | 0.43% | 1.03 | 31.01% | -0.45% | -1.37 | 17.35% |
| -2 | 0.28% | 0.66 | 51.06% | -0.53% | -1.50 | 13.71% |
| -1 | 0.29% | 0.67 | 50.41% | -0.75% | **-1.89*** | 6.23% |
| 0 | 0.34% | 0.75 | 45.80% | -0.58% | -1.59 | 11.54% |
| 1 | 0.36% | 0.74 | 46.21% | -0.57% | -1.43 | 15.37% |
| 2 | 0.31% | 0.59 | 55.68% | -0.73% | **-1.83*** | 7.05% |
| 3 | 0.08% | 0.14 | 89.18% | -0.67% | **-1.71*** | 9.01% |
| 4 | 0.14% | 0.26 | 79.51% | -0.65% | -1.60 | 11.30% |
| 5 | 0.13% | 0.21 | 83.19% | -0.74% | **-1.74*** | 8.59% |
| 6 | -0.05% | -0.07 | 94.18% | -0.80% | **-1.68*** | 9.56% |
| 7 | -0.21% | -0.30 | 76.54% | -0.97% | **-1.81*** | 7.33% |
| 8 | 0.00% | 0.00 | 99.82% | -0.89% | **-1.78*** | 7.80% |
| 9 | 0.03% | 0.04 | 96.56% | -1.14% | **-1.98*** | 5.19% |
| 10 | 0.10% | 0.13 | 89.81% | -0.93% | **-1.67*** | 9.83% |

#### 4.3.2.2.1 Upgrades

Moving on to the CARs; with only two statistically significant reactions on days -5 and -4; it can be said that not unlike the reactions in the AARs these reactions could be highlighting an information leakage or speculation before the actual event day.

#### 4.3.2.2.2 Downgrades

The CARs of downgrades provided the strongest reaction in this event window, a total of 11 reactions were statistically significant, a majority of them were negative; describing a fall in stock prices. Based on the CARs consecutively significant reactions from trading day 5 to 10, the market reaction to downgrades seem to be delayed as the brunt of the price movement occurs after the event.

This is a clear indication that the markets do react to downgrades, and significantly more than the reaction to upgrades. The fact that the reaction is delayed could be attributed to the liquidity in the market or simply slow or weak informational efficiency in the GCC.

### *4.3.2.3 CAARs*

**Table 5: CAARs Upgrades v. Downgrades**

| **Event window** | **(-10,+10)** | **(-5,+5)** | **(-3,+3)** | **(-1,+1)** |
|---|---|---|---|---|
| **Panel A upgrades** | | | | |
| **CAAR** | 0.10% | -0.28% | -0.59% | 0.07% |
| **T-stat** | 0.13 | -0.57 | -1.44 | 0.27 |
| **P-value** | 89.95% | 57.06% | 15.92% | 79.21% |
| **Panel B downgrades** | | | | |
| **CAAR** | -0.93% | -0.39% | -0.36% | -0.04% |
| **T-stat** | -1.67 | -1.13 | -1.33 | -0.34 |
| **P-value** | 10.21% | 26.39% | 19.15% | 73.63% |

#### 4.3.2.3.1 Upgrades

After calculating the CAARs and the relevant test statics for all four event windows (following the Pukthuanthong-Le, Elayan and Rose, 2007 method), the results conclude that CAARs for upgrades are not statistically significant for all the event windows.

#### 4.3.2.3.2 Downgrades

After looking at the CAAR data it can be seen that the downgrades are also not statistically significant, however, in the (-10,+10) event window downgrades are extremely close to being statistically significant at the 10% level.

### 4.3.3 Conclusions

Based on the significance tests, particularly the AAR and CAR, it can be concluded that GCC stock markets' do react to sovereign rating changes, regardless of whether it is an upgrade or a downgrade. However, the reaction is far stronger and more significant with downgrades[50].

The CAARs however fail all significance testing; this is a consequence of the averaging out process that is involved in calculating the CAAR as it leads to more difficult significance testing by averaging out the sample.

With regards to the a priori expectations[51] it is not fully invalidated by this result; the downgrades are still more statistically significant compared to upgrades, particularly if one is looking at the 5% confidence level exclusively, this result matches that of the previous literature, particularly the papers by (Brooks et al, 2004; Pukthuanthong-Le, Elayan and Rose, 2007; Klimavičienė, 2011; Paterson and Gauthier, 2013)

[50] This is reinforced by the significance tests on the CAARs as the downgrades are very close to being significant whereas the upgrades are not.

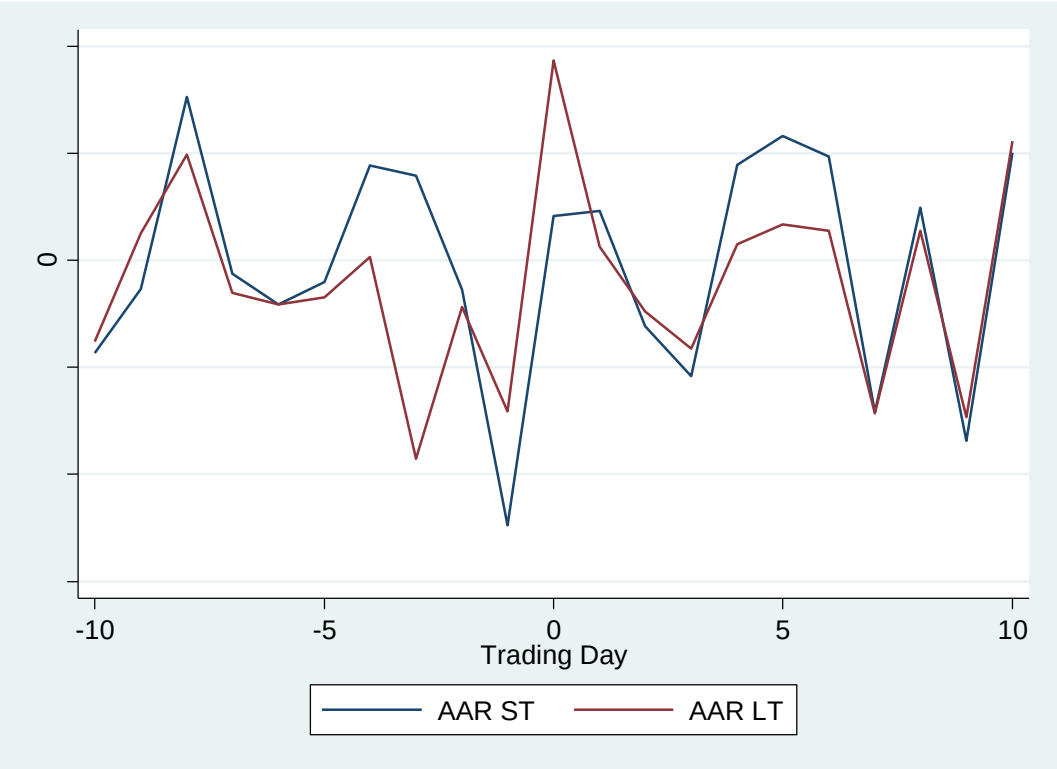
[51] that sovereign rating upgrades have no influence on stock markets compared to downgrades

## 4.4 Objective 3

After filtering the AR and CAR data to show the ratings from S&P exclusively,[52] then the data is filtered again based on whether the S&P rating was a short term or a long term rating. The following results are displayed:

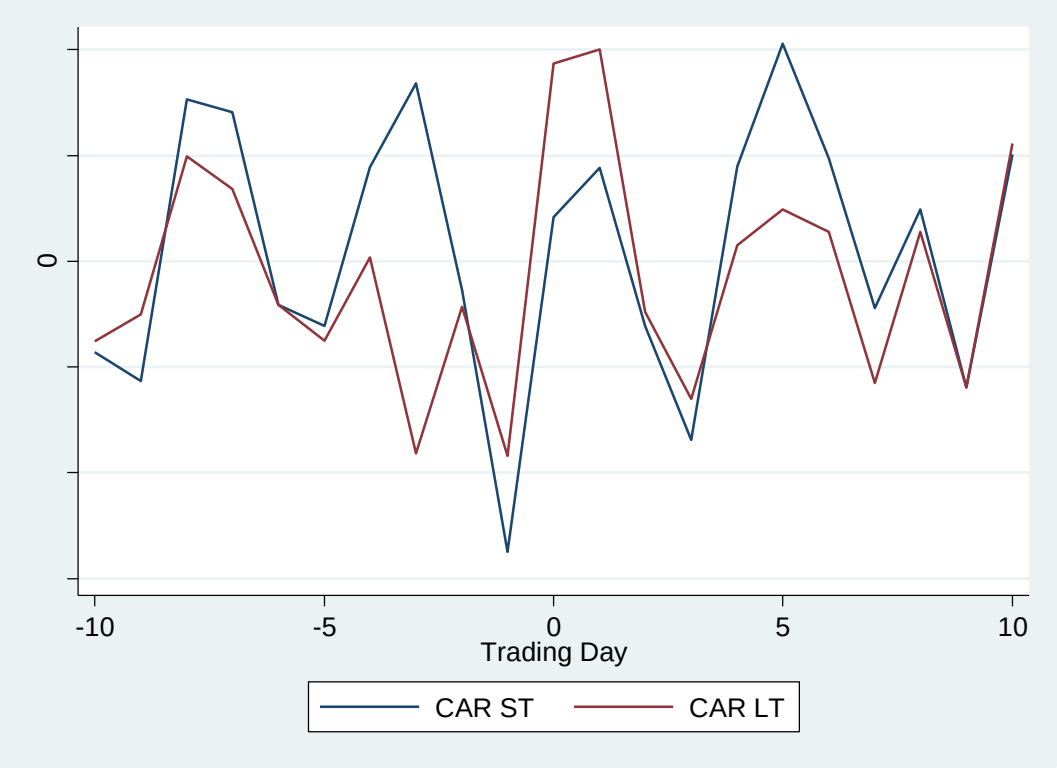
### 4.4.1 Abnormal Returns

**Figure 9: AARs ST v. LT**




[52] Since only S&P provides ST and LT data in this sample

**Figure 10: CARs ST v. LT**




Regarding Figure 9, the graph clearly shows that both ST and LT reactions are similar, and that both LT and ST sovereign changes roughly warrant the similar responses from the stock market, however the objective is not to test for whether there is a reaction; the objective is to test for whether there is a statistically significant difference between the LT and ST reactions. So what must be focused on is the area between two lines in the figure.

As for Figure 10, the CARs show that for the most part the ST reactions are stronger, indeed the ST CAR is higher for most[53] of the event window, however roughly on the event day the situation is reversed and long term CAR reactions peak before falling back again.

### 4.4.2 Significance testing

The significance testing procedure for this objective will be slightly different compared to objectives one and two; this is because in this objective the goal is to test whether there is a statistically significant difference between the reactions to ST and LT S&P sovereign ratings as opposed to testing

[53] This is reversed from trading day -1 to +3

for the statistical significance of the reactions in general. As such a paired t-test will be used as opposed to the cross sectional t-tests used earlier.

**Table 6: AARs & CARs ST v. LT paired T tests**

| Event window | (-10,+10) | (-5,+5) | (-3,+3) | (-1,+1) |
|---|---|---|---|---|
| **Panel A: AARs** | | | | |
| **Paired T-stat** | 0.94 | 0.78 | 0.07 | -1.34 |
| **P-value** | 35.73% | 45.53% | 94.98% | 31.27% |
| | | | | |
| **Panel B: CARs** | | | | |
| **Paired T-stat** | 1.05 | 0.64 | 0.00 | **-7.25**** |
| **P-value** | 30.50% | 53.89% | 93.93% | 1.85% |

The results tabularised on Table 6 indicate that there is no statistically significant difference between the abnormal returns for ST ratings as opposed to LT ratings for most event windows. However the -1,+1 event window shows that there is a significant difference between the reactions near the event day. However, it can be argued that this result is a mere consequence of the small event window rather than an actual difference between the results and hence it should not be taken seriously.

### 4.4.3 Conclusions

The results are not unexpected, as the market that is being tested in this paper is not known for its liquidity hence the differences between the reactions of ST and LT sovereign rating changes would be difficult to discern, moreover, only one CRA offers ST sovereign ratings in the region[54] meaning that the already small sample size would shrink further, making hypothesis testing even more problematic.

Previous literature testing the differences between the reactions based on ST v. LT is sparse, therefore there is no strong a priori expectation, however if this was tested in a more liquid market, with significantly more events, then perhaps the results would show a strong difference between the two, nonetheless, in the GCC's context, the difference in reactions between ST and LT sovereign ratings is negligible if not outright non-existent.

[54] S&P

## 4.5 Objective 4

After discarding the ST S&P events, the remaining events were sorted based on the CRA. When (Brooks et al, 2004) tested this objective they created three event windows, first a pre-event window from (-10,-1), second an event day window spanning (0,+1) and finally a post event window spanning (+2,+10). Brooks tested the CAR for the pre-event and post-event window but for the event day window the AAR was tested, the justification of why CARs and AARs were used for the different event periods was not explained very well. Therefore for this thesis it was decided to use paired AAR t-tests and CAR instead, following on the techniques used by (Pukthuanthong-Le, Elayan and Rose, 2007).

### 4.5.1 Abnormal returns

**Figure 11: AARs Upgrades S&P v. Moody's v. Fitch**

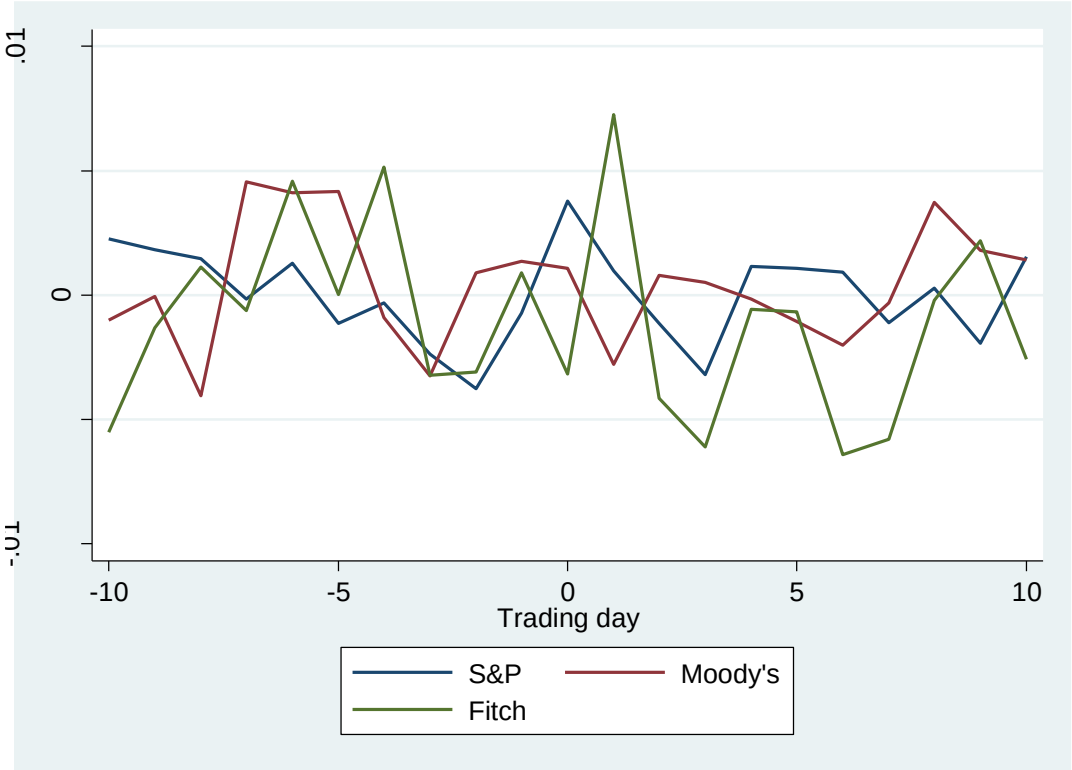
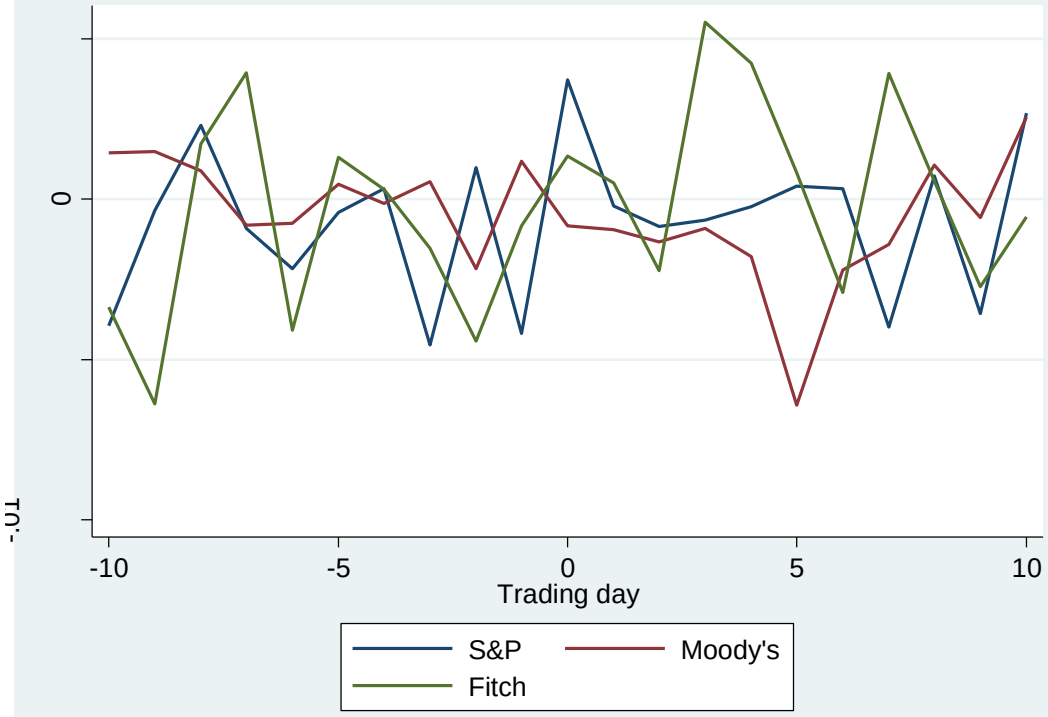


**Figure 12: AARs Downgrades S&P v. Moody's v. Fitch**



A quick glance at Figure 11 & Figure 12 above show that, in terms of AAR, the differences between the reactions on a CRA by CRA basis is impossible to detect, however the reactions might be easier to discern If CARs were used:

**Figure 13: CARs Upgrades S&P v. Moody's v. Fitch**

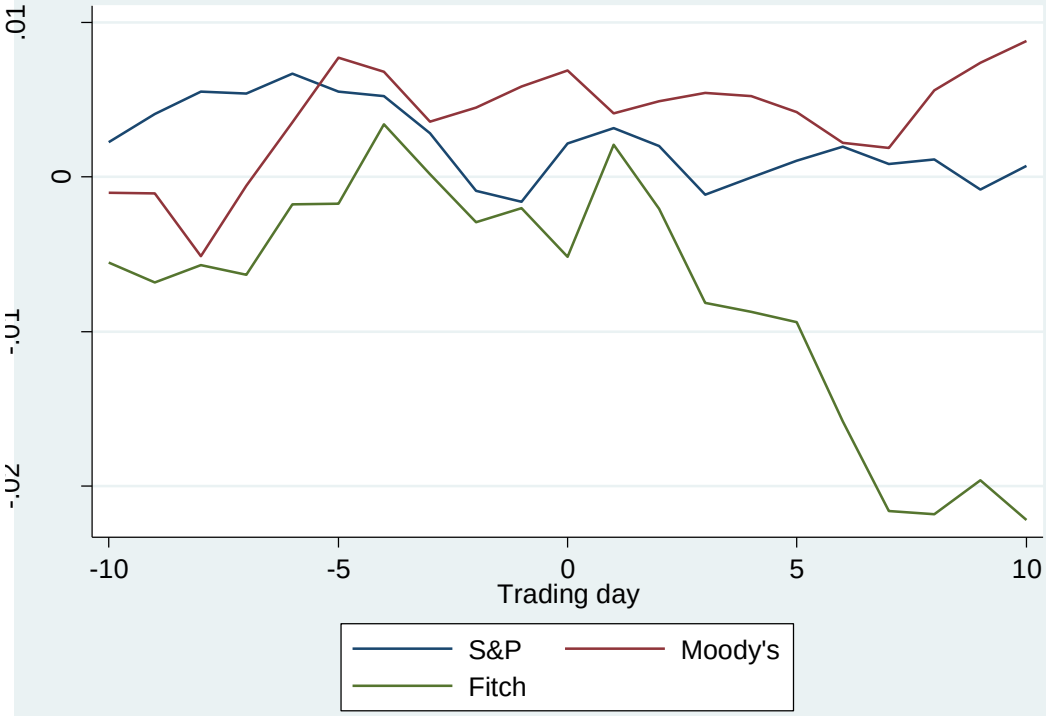


Figure 14: CARs Downgrades S&P v. Moody's v. Fitch


Both Figure 13 and Figure 14 paint a better picture of the relationships between the CRAs, focusing on the ratings by Fitch, after the event day for both upgrades and downgrades Fitch ratings events seem to cause a strong yet exaggerated reaction which is then compensated for after the event. Whereas with Moodys events; the reactions seem to be late, beginning on the event date if not after. As for S&P the reactions shown are textbook cases of how the market should react to rating changes, with the majority of the reaction occurring on or slightly before the event day and remaining relatively stable after.

### 4.5.2 Significance testing

Table 7: CARs S&P v. Moodys v. Fitch

| | **Upgrades** | | | **Downgrades** | | |
|---|---|---|---|---|---|---|
| **CRA** | S&P | Moody's | Fitch | S&P | Moody's | Fitch |
| **CAR *(-10,+10)*** | 0.22% | 0.39% | -0.77% | -0.91% | -0.25% | -0.72% |
| **STDEV** | 0.25% | 0.35% | 0.80% | 0.42% | 0.65% | 0.38% |
| **T-stat** | **4.08*** ** | **5.13*** ** | **-4.42*** ** | **-9.93*** ** | -1.76 | **-8.79*** ** |
| **P-value** | 0.27% | 0.01% | 0.31% | 0.00% | 10.43% | 0.00% |

**Table 8: Paired AAR T-tests S&P v. Moodys v. Fitch[55]**

Panel A: (-10,+10)

| | S&P | Moody's | Fitch |
|---|---|---|---|
| S&P | - | 0.589742 | 0.219815 |
| Moody's | 0.788675 | - | 0.130278 |
| Fitch | 0.566993 | 0.752802 | - |

Panel B: (-5,+5)

| | S&P | Moody's | Fitch |
|---|---|---|---|
| S&P | - | 0.557431 | 0.876005 |
| Moody's | 0.590863 | - | 0.6286 |
| Fitch | 0.352456 | 0.169077 | - |

Panel C: (-3,+3)

| | S&P | Moody's | Fitch |
|---|---|---|---|
| S&P | - | 0.578618 | 0.656022 |
| Moody's | 0.90209 | - | 0.517782 |
| Fitch | 0.709803 | 0.752426 | - |

Panel D: (-1,+1)

| | S&P | Moody's | Fitch |
|---|---|---|---|
| S&P | - | 0.500143 | 0.942719 |
| Moody's | 0.994681 | - | 0.716759 |
| Fitch | 0.767468 | 0.718744 | - |

Beginning with Table 7Table 8, the hypothesis tests show that based on aggregated CAR, all reactions save Moody's downgrades are statistically significant at a 1% level. The strongest reaction in terms of significance is the reaction to S&P downgrades. This result is in-line with a priori expectations. Table 7 only exists to confirm whether the reactions are significant, it should not be used to determine which reaction is stronger if any.

Moving on to Table 8 which is more important as it tests the differences between the CRAs (using AARs as opposed to CARs), none of paired t tests are statistically significant, regardless of the event window, and this result indicates that there is no statistically significant difference between the reactions based on the CRA.

### 4.5.3 Conclusions

The results are conclusive, particularly those of Table 8, they suggest that in the GCC context, the stock market's reactions to sovereign rating changes are same regardless of which CRA issues the rating. This is not in-line with a priori expectations; which suggested that S&P and/or Fitch would garner the strongest reactions particularly in sovereign rating downgrades (Brooks et al, 2004;

[55] All the data is represented as P-values rather than T stats. The upper triangles represent upgrades and the lower are downgrades

Paterson and Gauthier, 2013). This result is perhaps a consequence of the illiquid GCC market or the small sample size.

Another reason for this result is the possibility that the GCC market does not make any distinctions between the rating agencies as when a CRA re-rates an entity the remaining CRAs quickly follow, this could suggest that the stock market only reacts to the first re-rating event, nullifying any distinctions between the CRAs.

## 4.6 Objective 5

As mentioned earlier, the UAE and Kuwait simply do not have enough data to be tested, as they only have data for upgrades. Therefore, it was decided that the UAE and Kuwait sovereign rating events will be dropped in this test.

### 4.6.1 Abnormal Returns

**Figure 15: CARs Upgrades Saudi v. Oman v. Bahrain v. Qatar**

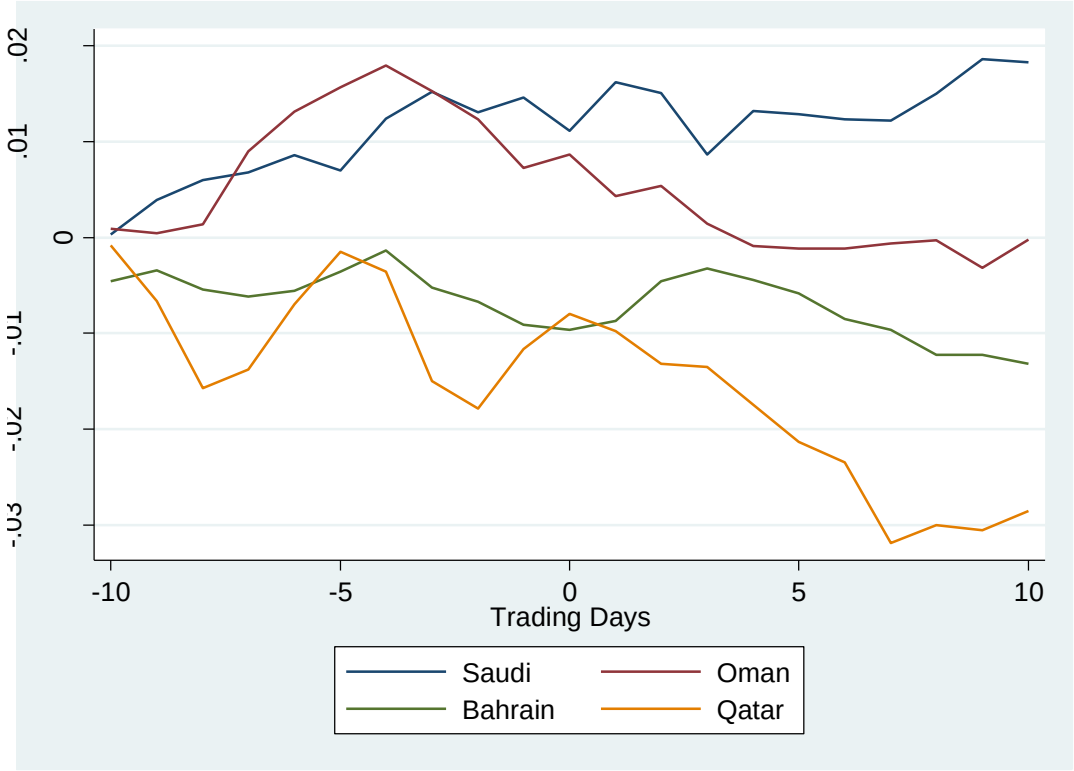
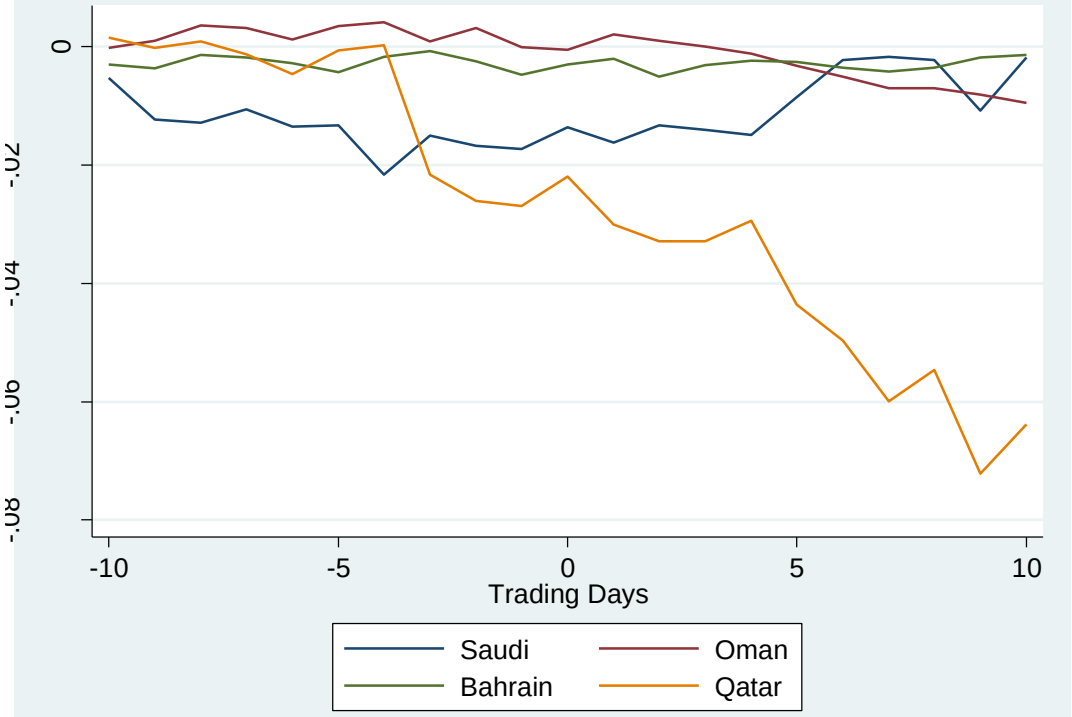


Figure 16: CARs Downgrades Saudi v. Oman v. Bahrain v. Qatar




Both Figure 15 and Figure 16 show an upward trend and a downward trend respectively which is exactly what is expected as the former is a graph of upgrades and the latter is a graph of downgrades exclusively.

In both graphs, Qatar is the least stable with a downwards trend for both upgrades and downgrades; however the trend is stronger in downgrades. As for the other countries, the downgrades seem to converge overtime whereas the upgrades are scattered.

### 4.6.2 Significance testing

Table 9: CAARs Saudi v. Oman v. Bahrain v. Qatar

| | Upgrades | | | | Downgrades | | | |
|---|---|---|---|---|---|---|---|---|
| | Saudi | Oman | Bahrain | Qatar | Saudi | Oman | Bahrain | Qatar |
| CAAR | 1.83% | -0.02% | -1.32% | -2.85% | -0.19% | -0.95% | -0.13% | -6.38% |
| T-stat | 1.35 | -0.02 | -0.81 | -1.72 | -0.23 | -0.97 | -0.19 | **-2.22*** |
| P-value | 20.05% | 98.49% | 46.19% | 12.83% | 82.45% | 35.30% | 84.76% | 9.02% |

**Table 10: AAR Paired T tests Saudi v. Oman v. Bahrain v. Qatar**[56]

| Panel A: (-10,+10) | Saudi | Oman | Bahrain | Qatar |
|---|---|---|---|---|
| Saudi | . | 0.3667827 | **0.0824426*** | 0.1187674 |
| Oman | 0.777839 | . | 0.4226558 | 0.2387817 |
| Bahrain | 0.982786 | 0.4406368 | . | 0.5077323 |
| Qatar | 0.159813 | 0.1228201 | 0.1038996 | . |

| Panel B: (-5,+5) | Saudi | Oman | Bahrain | Qatar |
|---|---|---|---|---|
| Saudi | . | 0.2783895 | 0.778248 | 0.454595 |
| Oman | 0.6335671 | . | 0.126852 | 0.9974 |
| Bahrain | 0.7835651 | 0.6297718 | . | 0.40945 |
| Qatar | 0.2624672 | 0.2121669 | 0.195866 | . |

| Panel C: (-3,+3) | Saudi | Oman | Bahrain | Qatar |
|---|---|---|---|---|
| Saudi | . | 0.4059473 | 0.8987741 | 0.7720105 |
| Oman | 0.431077 | . | 0.1022091 | 0.7128049 |
| Bahrain | 0.394437 | 0.7426614 | . | 0.6222264 |
| Qatar | 0.18804 | 0.2417957 | 0.2312318 | . |

| Panel D: (-1,+1) | Saudi | Oman | Bahrain | Qatar |
|---|---|---|---|---|
| Saudi | . | 0.4838395 | 0.534956 | 0.742207 |
| Oman | 0.8829624 | . | 0.443948 | 0.214468 |
| Bahrain | 0.987273 | 0.7249391 | . | 0.419057 |
| Qatar | 0.5489861 | 0.8641445 | 0.747813 | . |

Looking at Table 9, the only statistically significant result is that of Qatar and only in downgrades. Looking at both the results, it seems that Qatar has the most significant reaction in both upgrades and downgrades, however it must be noted that the upgrades are not statistically significant whereas the downgrades are.

Moving on to Table 10, whilst all the results are statistically insignificant save for in the (-10,+10) event window where Bahrain's upgrades are significant at a 10% level when compared to Saudi's, this suggests that Bahrain's upgrades are different when compared to Saudi Arabia's upgrades, however Bahrain's result seems to be an outlier as the rest of its results are grossly insignificant.

[56] All the data is represented as P-values rather than T stats. The upper triangles in the panels represent upgrades and the lower are downgrades

Observing Qatar's results in Table 10, the conclusions from Table 9 are echoed, as Qatar seems to have to the strongest reactions when compared to the other countries, however it must still be noted that Qatar's reaction is not statistically different than the other countries in terms of AAR.

### 4.6.3 Conclusions

The results are inconclusive, the data is insignificant. However, it hints towards the fact that Qatar has the strongest reactions from any other country in the GCC, particularly in sovereign rating downgrades. Nonetheless the significance tests clearly show that the differences are miniscule and almost non–existent.

In conclusion it would not be incorrect to say that for sovereign rating downgrades, Qatar has the strongest reactions of the four[57] GCC countries tested. As for upgrades, there is no statistically significant difference in the reactions of between the four countries tested.

This objective does not have any a priori expectations; the previous research did not make distinctions based on each country being tested, rather distinctions were made based upon whether the country is an emerging or a developed country (Brooks et al, 2004; Pukthuanthong-Le, Elayan and Rose, 2007) both concluding that the difference of reactions between developing and developed countries are insignificant.

[57] Saudi Arabia, Oman, Bahrain, and Qatar

## 4.7 Results and the hypotheses of the paper

In the introduction three objectives were proposed, each with the relevant null and alternative hypotheses. A brief reminder of the objectives and hypotheses:

### 4.7.1 Objective 1:

*To quantitatively assess whether sovereign credit ratings changes have any influence on the stock market's returns.*

#### *4.7.1.1 Null hypothesis:*

$H_0$: Sovereign ratings have no influence on stock market returns

#### *4.7.1.2 Alternative hypothesis:*

$H_1$: Sovereign ratings have an influence on stock market returns

The null hypothesis was rejected as the results clearly shows that there is a statistically significance reaction to sovereign rating changes, however the reactions are not symmetric.

### 4.7.2 Objective 2:

*To assess whether the stock markets react differently for sovereign rating upgrades compared to downgrades.*

#### *4.7.2.1 Null hypothesis:*

$H_0$: There is no difference in stock market reactions to an upgrade compared to a downgrade in the sovereign rating

#### *4.7.2.2 Alternative hypothesis:*

$H_1$: There is a difference in stock market reactions to an upgrade compared to a downgrade in the sovereign rating

The null hypothesis is also rejected for this objective as the significance testing indicate that downgrades garner a stronger reaction as opposed to upgrades

### 4.7.3 Objective 3:

*To assess whether the stock markets react differently for a change in the long term rating compared to a change in the short term rating*

#### *4.7.3.1 Null hypothesis:*

$H_0$: There is no difference in stock market reactions to a long term change in the sovereign rating compared to a short term change

#### *4.7.3.2 Alternative hypothesis:*

$H_1$: There is a difference in stock market reactions to a long term change in the sovereign rating compared to a short term change

As for the third objective the null and alternative hypotheses have to be modified to reflect the reality of data availability therefore;

#### *4.7.3.3 New null hypothesis:*

$H_0$: There is no difference in stock market reactions to ***S&P*** long term changes in the sovereign rating compared to ***S&P*** short term changes

#### *4.7.3.4 New alternative hypothesis:*

$H_1$: There is a difference in stock market reactions to ***S&P*** long term changes in the sovereign rating compared to ***S&P*** short term changes

The 'new' null hypothesis cannot be rejected; therefore, there is no statistically significant difference between the GCC market's reactions to S&P short term ratings compared to long term ratings changes.

### 4.7.4 Objective 4:

*To assess whether there is a statistically significant difference between the GCC stock market's reactions based on which credit rating agency issued the rating.*

#### 4.7.4.1 *Null hypothesis:*

$H_0$: There is no difference in stock market reactions based on which credit rating agency issued the rating

#### 4.7.4.2 *Alternative hypothesis:*

$H_1$: There is a difference in stock market reactions based on which credit rating agency issued the rating

The null hypothesis cannot be rejected; therefore the GCC stock markets are indifferent to which CRA issued the sovereign rating.

### 4.7.5 Objective 5:

*To assess whether there is a statistically significant difference between each GCC country's stock market's reactions to a sovereign ratings changes.*

#### 4.7.5.1 *Null hypothesis:*

$H_0$: There is no difference in stock market reactions to sovereign rating changes across the GCC[58]

#### 4.7.5.2 *Alternative hypothesis:*

$H_1$: There is a difference in stock market reactions to sovereign rating changes across the GCC

The null hypothesis is rejected; therefore there is a statistically significant difference between the stock market's reactions in the GCC. Particularly the Qatari stock market seemed to react much stronger as opposed to the other markets being tested

[58] This includes the following four countries: Saudi Arabia, Bahrain, Oman, and Qatar. Other GCC countries were ignored in this test due to the lack of sovereign ratings.

# 5 CHAPTER FIVE: Conclusion

## 5.1 Introduction

The goal of this paper was to test for whether sovereign credit ratings have any influence on the GCC stock market, this objective evolved into multiple others over the course of this paper.

The first permutation was to test for whether the stock markets react differently to sovereign rating upgrades as opposed to downgrades; after sifting through the data and running the hypothesis tests it was concluded that in the GCC the markets do react to sovereign rating changes moreover, the reactions are stronger in the case of downgrades. This result was not in line with previous literature as the vast majority of literature suggested that whilst downgrades will have a significant influence on the stock markets, upgrades will have no influence at all[59]. However, this paper's result is echoes by Vince Hooper, Timothy Hume, Suk-Joong Kim' 2008 paper where both upgrades and downgrades were significant.

Another objective was to test for whether the GCC markets reactions differ based on whether the sovereign rating was of the long term or short term variety. There were several challenges to testing this objective, the most difficult of which was that only one rating agency (S&P) provided short term ratings in the region, therefore the sample size was miniscule compared to long term sovereign ratings; to solve this issue, it was decided that discarding all non-S&P events would be the best way to move forward, therefore this objective was tested for S&P ratings exclusively. After running the hypothesis tests, the results showed that there was no statistically significant difference between the reactions to short term rating vs. long term ratings, therefore it can be concluded that the GCC stock market is indifferent to whether an S&P rating change was short or long term as the market would react the same way regardless.

The third objective this thesis tried to answer was whether GCC stock markets' reactions differ based on which CRA the sovereign rating was issued by. Previous literature such as the Brooks et al. paper tested this and concluded that sovereign ratings issued by S&P and Fitch would garner a stronger

[59] Which is not the case in the GCC as both upgrades and downgrades are significant.

reaction as opposed Thomson or Moody's. However, this result is not applicable for the GCC as after running the tests it was concluded that the GCC stock markets are indifferent to which agency the rating was issued by.

The final objective was to test for whether there is a statistically significant difference between the reactions of each country's stock market. To test this objective a minor obstacle had to be surmounted, that is; the UAE and Kuwait did not have enough events to be statistically significant or useful in this comparison, therefore, it was decided that the only way to move forward was to discard both the UAE and Kuwait from this comparison. The results show that of the four remaining GCC countries[60]; Qatar's reactions are strongest, but only in the case of downgrades; in the case of upgrades there is no significant difference in the reactions.

To achieve all these goals several assumptions had to be made, first, the returns generated by the stock market (without accounting for the events) follow the market model. This assumption was made due to the fact that to calculate abnormal returns, a standard normal return has to be inferred, and based on previous literature the best model to suit this type of research is the market model.[61]

The second assumption was that the market is indifferent to whether a sovereign rating is a first time rating or an upgrade. This assumption was made as the privilege of testing first time ratings independently would have not have yielded significant results due to the small size of the GCC and lack of historic pricing data for the old first time ratings.

The final assumption was that the markets make no distinction between multi-level rating changes, this assumption -like the second one- was a consequence of the sample size issue; as the act of separating the sovereign ratings into multi-level upgrades vs. downgrades would have been detrimental to the significance testing.

The results showed that GCC markets do react in a similar way to other developing markets such as with downgrades garnering a stronger reaction than upgrades; however the results also showed that

[60] Saudi Arabia, Oman, Bahrain, and Qatar
[61] This is discussed further in the Methodology chapter

the GCC does not always react in line with other developing countries, as demonstrated by the stock market's indifference to the rating agency issuing the sovereign rating. Overall; the results demonstrated that the GCC's relatively new stock market is growing on par with the stock markets of other developing nations.

The conclusions drawn from this paper were not unsurprising; it was expected that some of the results will fail significance testing, mainly due to the less than stellar liquidity within the GCC and the small sample size, however it can be argued that if both issues were solved the GCC markets would react to sovereign ratings in exactly the same manner as any other developing nations.

In hindsight, if this paper were to be remade, the one thing that would be changed would be the sample; as mentioned in the recommendations, testing the MENA region -including the GCC- would yield a significantly more informative paper than testing the GCC exclusively moreover such a paper can highlight differences between reactions between multiple regions.

## 5.2 Implications of the results

The results of this paper have implications on several stakeholders, the most significant of which are the GCC investors. With the information derived from this thesis, investors have to account for the fact that sovereign ratings do have an influence on GCC stock markets; hence, investors can make use of sovereign rating outlooks to anticipate changes in sovereign ratings and better time their buy/sell decisions. Investors should also account for the fact that GCC stock markets are indifferent to which CRA issued the sovereign rating and to whether the rating is short term or long term.

Listed GCC corporations are also influenced by the results of this thesis, -in a manner not dissimilar to that of investors- corporations should use sovereign rating outlooks to better time their new issues or buybacks in order to make more efficient stock market transactions Furthermore, this paper should dissuade corporations from being listed in a country with an unstable sovereign rating as that will have negative consequences on stock prices.

As was discussed earlier, sovereign rating changes can urge governments to reform regulations in order to protect their economies. The results from of this thesis argue that government reactions to sovereign rating changes should be asymmetrical, as downgrades display stronger reactions in stock markets compared to upgrades. Moreover, the results show that government reactions are not unwarranted as changes in sovereign ratings do have a contagion effect on stock markets and the economy as a whole.

## 5.3 Limitations of the paper

This thesis suffered from a myriad of sample based issues, at the simplest level; some GCC countries only had upgrades and no downgrades furthermore they were not rated by all three CRAs[62] to solve these issues for some of the objectives these countries had to be discarded. Another sample issue was the lack of short term ratings from any CRA other than S&P which meant that the hypothesis had to be modified when comparing short term reactions to long term ones. The final and most important sample issue was the lack of historic price data for both for the stock indices and GCC based benchmarks past the early 2000s. Many sovereign rating events had to be discarded as there was simply no historic data available at that period. In hindsight the lack of sample size can be seen as the main reason for the relative drought of financial papers based on the GCC, the only solution to this issue is to test the entire Arabian Peninsula or the MENA region as opposed to the GCC exclusively.

Another issue that could have influenced the results was the fact that the GCC is a new player in the sovereign bond market; therefore the ratings are relatively new as opposed to other developing countries meaning that the GCC is yet to build the trust that other developing countries built. Moreover, the unique oil wealth of GCC countries would have influenced the ratings as significant oil reserves can be seen as collateral for debtors; hence GCC countries ratings should not be compared to non-natural resource rich developing countries.

With the countries being relatively new players to the bond market comes the inexorable fact that there is a weakness in previous research, as there is little research done testing the effects of sovereign

[62] Kuwait and UAE for example.

ratings in GCC markets[63], however previous researchers such as Brooks have tested GCC countries as a small part of their global tests, and as such they do not have results for the GCC context exclusively. The lack of previous GCC literature meant that the closest alternative was to assume the GCC perspective by simply treating the GCC as part of the pool of developing countries that were tested in previous research allowing for the inference and a priori expectations for some of the tests.

## 5.4 Recommendations for future research

As was briefly mentioned earlier, conducting this research from the GCC perspective had some significant drawbacks, mainly the lack of historic data and small number of events. Therefore the best recommendation for any future research is, instead of examining the GCC perspective exclusively, more countries in the region should be used, such as for example the MENA region. Another advantage of conducting the research in such a manner is the fact that comparisons between the different regions can be conducted which could yield informative results.

Moreover, as was mentioned earlier: this thesis had to treat multiple level rating changes and single level rating changes equally, future researchers could make the attempt at separating out the multiple level rating changes and testing them against single level rating changes, however, they would have to first overcome the sample size issue.

Another assumption that was made in this paper due to data availability was the assumption that the markets are indifferent to first time ratings as opposed to upgrades, this assumption could not be tested as for a majority of the region, first time ratings begin much earlier than the historic price data meaning developing market models is impossible. Drawing the comparison between first time ratings and upgrades would be interesting even for non-GCC countries.

In conclusion, it can be definitively said that sovereign bond rating changes do have a contagion effect on the GCC stock markets; this effect is significantly stronger in the case of downgrades and more so

[63] Stock markets or bond markets

ones occurring in Qatar. Furthermore, the GCC stock markets are indifferent to which CRA issued the sovereign rating or whether the rating was a short term or long term rating.

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