Sovereign rating changes: how they affected the stock markets of the PIIGS countries during the European sovereign debt crisis

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Abstract

The focus of this paper is to study the effect of sovereign rating changes in the PIIGS (Portugal, Italy, Ireland, Greece and Spain) national stock markets during the European sovereign debt crisis. In my research I find that (1) downgrades convey more information to the market than upgrades. (2) The reaction varies between countries; with only Greece having a significant market reaction on the event day and with Italy and Spain not having a discernible reaction to the announcements. (3) The reactions differ depending on the agency that subscribed the announcement, with only S&P downgrades producing a significant market reaction on the day of the announcement and with Moody's and Fitch upgrades producing significant reaction but only the day after the announcement. (4) Finally, I establish that Greece downgrade announcements don't spillover to Portuguese and Irish stock markets.

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Dissertation submitted in partial fulfillment of requirements for the degree of MSc in Business Administration, at the Universidade Católica Portuguesa, September 2015

Acknowledgements

First and foremost, I would like to thank my supervisor Joni Kokkonen for his continuous support and help throughout the development of this thesis.

Furthermore I would also like to thank my family and my girlfriend Marília for their help and backing during the last two years. Additionally, I would like to thank my colleague Miguel Rodrigues for his critical spirit and ideas which helped me in times of doubt.

Finally I would like to express my sincere thanks to Católica Lisbon SBE which allowed me to learn and improve with and alongside the best.

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1. Introduction

Sovereign ratings are grades that quantify the likelihood of default of a nation's government but they also give important information to investors about the countries macroeconomic and political environment. Given the fact that investors and managed funds are becoming increasingly international and look for international diversification requiring greater and more accurate information, they see sovereign ratings as a major risk indicator for the country's risk (Hooper et al., 2008). When that information is incorporated by the market it can have a large effect in the pool of investors since some institutional investors may only hold investment-grade instruments and also affect the private sector because as stated by Brooks et al. (2004, p.3) "The change of sovereign ratings is one such key event that may trigger substantial re-weighting of international portfolios." Additionally, Kaminsky and Schmukler (2002, p.2) say "When a credit rating agency downgrades a country's sovereign debt, all debt instruments in that country may have to be downgraded accordingly because of the sovereign ceiling doctrine.[1]"

During the European sovereign debt crisis (2009-2014) rating agencies were under a lot of pressure from the public opinion and were criticized by their succession of downgrades in some European countries, predominantly the so called PIIGS (Portugal, Italy, Ireland, Greece and Spain). This countries were characterized by high deficits and large debt, which contributed to increase the instability and particularly their already high borrowing costs working as a self-fulfilling prophecy, which drove some of them (Portugal, Ireland and Greece) to request external financial assistance to avoid default on their sovereign debt. Previously the rating agencies had already been criticized by behaving pro-cyclically, Ferri et al. (1999) demonstrated that during the pre and post-crisis periods in the East Asia crisis, rating agencies criteria weighted more in their qualitative assessment than in the economic fundamentals exacerbating the economic cycle. Furthermore, Reisen and von Maltzan (1999) point to the potential of ratings for attenuating the euphoria of investors if assigned early, but have been used wrongly by the agencies and contributing to the boom-bust cycles in the international financial markets.

[1] States that in most countries and most situations the private sector cannot borrow in better terms than the government

The majority of the current literature in credit ratings focuses on corporate rating announcements and their effects on bonds and individual stock. The research seems to indicate that positive announcements have no effect in either group but there seems to be a negative impact in both types of assets in the case of negative announcements. Norden and Weber (2004) present a summary of this literature, their data and results (see also Hull et al. (2004) and Goh and Ederington (1999).

Although the majority of research focuses on corporate ratings there is a body of literature that focuses on the effects of sovereign credit ratings. It can be divided in several topics: studies that look to the determinants of the ratings like Cantor and Packer (1996) ; studies that research the effect on the bond markets (see Cantor and Packer (1996), Afonso et al. (2011), Reisen and von Maltzan (1999), Larraín et al. (1997). And lastly, studies that examine the effects of sovereign rating announcements on the stock markets (Kaminsky and Schmukler (2002), Brooks et al. (2004), Pukthuanthong-Le et al. (2007), Ferreira and Gama (2007) and Hooper et al. (2008). My paper contributes to the research on the last category, analyzing the effect of sovereign rating changes in a small group of European countries national stock markets.

Kaminsky and Schmukler (2002) studied the effect of rating and outlook changes for emerging markets and check for cross-country and cross-security spillover effects. They conclude that the rating announcements affect stock markets and generate cross-country contagion, stronger for neighboring countries. They also determine that the effect is stronger during crisis and for non-transparent economies. Lastly their results support the idea of pro-cyclical behavior by the rating agencies. Brooks et al. (2004) investigates the national stock market impact of sovereign rating changes by four rating agencies in the period of 1973 to 2001. They discover that only downgrades have wealth impact in the stock markets, and more surprisingly that only two of the agencies, S&P and Fitch produce a significant market reaction unlike Moody's and Thomson (later merged with Fitch). Interestingly they also find that there is no significant different between emerging and developed economies in their reactions to the downgrades. Pukthuanthong-Le et al. (2007) studies the price impact of rating changes in both the stock and bond market for 34 countries in the period of 1990-2000. Their findings suggest that only bond markets react to rating upgrades and the stock markets only to negative announcements. Additionally bond

yields seem to anticipate downgrades, and downgrades mainly occur in market downturns which suggest pro-cyclical behavior by the rating agencies. Ferreira and Gama (2007) test the effect of sovereign debt and outlook changes of one country in other countries' stock markets over the period of 1989 to 2003. They find a negative reaction in the case of downgrades, but conclude that upgrades do not convene any information to the market. They also find an inverse relation between the distance amongst the countries and the impact of the spillover, meaning neighboring countries returns are more impacted by the rating change. Furthermore emerging market status also has an amplifying effect on the spillover. Hooper et al. (2008) looked at the disaggregated impact of sovereign rating changes, including outlook changes in national stock markets of 42 countries in the period of 1995-2003. Their results show a stronger response in the returns and volatility of the stock markets to downgrades, foreign currency debt, in crisis periods and in high debt countries.

In this paper I examine the national stock impact of sovereign credit rating announcements in the European countries denominated PIIGS, which include Portugal, Italy, Ireland, Greece and Spain. I will include rating and outlook changes of the three main rating agencies Moody's Investor Services, Standard & Poor's and Fitch Ratings[2] in the period of 2009 to 2014, characterized by the European Sovereign Debt crisis. Furthermore I will also investigate if there is a different reaction by the market based on the agency that assigns the new rating or outlook and a possible contagion of Greek downgrades to Portugal and Ireland. This study complements earlier research on the effects of sovereign rating announcements on the stock markets, by studying a group of countries characterized by high deficits and large public debt in a unique context of a sovereign debt crisis.

My results indicate that negative announcements produce a larger effect on the stock markets than the positive ones and that the reaction varies with each country, with only Greece producing significant effect on the event day, the Portuguese and the Irish markets showing some response although not statistically significant and with Italy and Spain showing less severe reactions. Second, positive announcements don't seem to produce a significant effect in any of the countries. Third, I found different reactions between each rating agency announcements, with only S&P producing a significant market

[2] Henceforth addressed respectively as Moody's, S&P and Fitch.

reaction on the day of the announcements in the case of downgrades and with Moody's and Fitch producing a significant reaction in upgrades but on the following day. Fourth, downgrades in Greece don't spillover to Portugal and Ireland stock markets.

The remainder of my paper is divided as follows. Section 2 describes institutional features and gives an explanation of sovereign credit ratings. Section 3 presents the Data. Section 4 describes the methodology used in my empirical analysis. Section 5 shows my empirical analysis subdivided in three topics (analysis by country, analysis by rating agency and Greece contagion study) and section 6 concludes the paper.

2. Credit ratings

Sovereign credit ratings are measures used to assess the probability of default or creditworthiness of a national government. It provides an indicator of the willingness and ability of the government's on paying its debt based on the terms it was issued. The most widely recognized international rating agencies, whose ratings I study during my thesis are: Fitch, Moody's and Standard & Poor's (S&P). Combined these agencies hold almost the entirety of the market that can be classified as an oligopoly (Uwe Blaurock, 2007).

Credit ratings are becoming increasingly important in the financial markets because of its growing lack of transparency with the globalization and establishment of more complex financial instruments that create the need for information from an independent source (Uwe Blaurock, 2007). Also due to its large influence it can affect the pool of investors, as noted in (Cantor and Packer, 1996, p.2) "many investors, particularly U.S. investors, prefer rated securities over unrated securities of apparently similar credit risk" and accordingly the governments seeks credit ratings to ease their access to capital. Ratings can be assigned for short-term and long-term obligations and can also be assigned separately for local or foreign currency. Rating agencies also provide information about possible short/mid-term evolutions on the ratings through two types of indicators: watches and outlooks, that have 3 possible scenarios to indicate the likelihood and direction of the change: positive, negative and stable.

Although each rating agency uses different individual scales on their ratings they present vast similarities between them, using several bands that then are subdivided in notches (Table I).

Table I - Rating scales of Moody's, S&P and Fitch

Moody's	S&P	Fitch	Description
Aaa	AAA	AAA	Prime
Aa1, Aa2, Aa3	AA+, AA, AA-	AA+, AA, AA-	High grade
A1, A2, A3	A+, A, A-	A+, A, A-	Upper medium grade
Baa1, Baa2, Baa3	BBB+, BBB, BBB-	BBB+, BBB, BBB-	Lower medium grade
Ba1, Ba2, Ba3	BB+, BB, BB-	BB+, BB, BB-	Non-investment/ speculative grade
B1, B2, B3	B+, B, B-	B+, B, B-	Highly speculative
Caa1, Caa2, Caa3	CCC+, CCC, CCC-	CCC	Extremely speculative
Ca	CC	CC	Imminent default
C	R, SD, D	C, RD, D	Default

It can be observed from the table that the ratings are graded in an ordinal order; therefore we can make comparisons between the ratings. For example we can conclude that A category ratings have less probability of default than the B or C categories.

On the determination of the ratings, the rating agencies state that they use innumerous economic, social and political factors[3]. Even though the criteria can be somehow defined it is hard to perceive the weights that are given to each variable when assigning the rating making it hard to anticipate the impact on the market (Cantor and Packer, 1996).

3. Data

Data used on this paper consist of sovereign credit rating announcements that include rating and outlook changes that are collected from the period of January 1, 2009 to September 30, 2014. The list of the sovereign credit announcements is compiled from Bloomberg and comprehends the three main credit rating agencies Fitch Ratings, Standard & Poor's and Moody's Investor Services. The data set doesn't provide information about the time of the announcement so there is some degree of uncertainty if the announcement is just before the end of the trading day or even after the market closes, which would mean

[3] S&P, Fitch and Moody's official websites

that the event could only produce an effect in the market after the event day (considering there's no anticipation or information leakage).

Daily price indexes for each of the five countries and measured in euros are collected from Bloomberg. To calculate benchmark returns the MSCI EU Index is used as the proxy for the market returns. This index includes large and medium capitalized firms from 13 developed markets and 4 emerging markets from Europe.

Table II makes a simple breakdown of the sample by country, agency and type of rating. It can be observed that during the sample period of less than 6 years there was an abnormally large number of rating announcements in a total of 126 for only 5 countries (illustratively, this makes an average of more than four ratings by country, each year, meaning the rating status changed roughly on average every 3 months) which demonstrates the political instability and the fluctuations of risk in the sovereign debt on this particular group of countries during this period.

Table II - Summary of rating agency activity during the sample period

	Fitch		S&P		Moody's		Total (country)
	Upgrades	Downgrades	Upgrades	Downgrades	Upgrades	Downgrades	
Portugal	0	5	2	9	2	7	25
Ireland	3	7	2	7	2	7	28
Italy	0	4	0	5	0	4	13
Greece	3	10	3	10	0	9	35
Spain	1	5	1	8	1	9	25
Total (agency)	7	31	8	39	5	36	**126**

Table II - This table contains all the sovereign rating events during the sample period across the three main rating agencies in the PIIGS countries. For simplification the announcements are only divided in Upgrades or Downgrades which include respectively all positive and negative announcements (i.e. outlook and watch changes).

The ratings distribution is quite asymmetrical between the countries with Greece being the most re-rated country (35) and Italy the least re-rated (13) but all negative, unlike the other countries which by the end of the sample period (and closing their assistance programs in the case of Portugal and Ireland) started to have rating upgrades but with only

Ireland being able to move from non-investment category to the upper levels. Interestingly Spain that was not under an external assistance program had more negative announcements than both Portugal and Ireland, showing high instability; nevertheless the rating, like Italy's, never left the investment grade categories. This indicates a more reactive than predictive behavior by the rating agencies that only do severe downgrades after the countries ask for external help and acknowledge a possible short-term default. The more active agency was S&P with a total of 47 ratings, against the 41 and 38 re-ratings of Moody's and Fitch respectively.

Due to the sample period being relatively small and being characterized by a lot of instability, there's a high clustering of events which can be observed in Figure 1. This figure shows the number of events in each semester, with downgrades showed in negative. In 2011, the peak of the crisis, there were over 40 downgrades and between July 2010 and July 2012 there were almost 80 rating changes. This concentration of events may cause bias and "contamination" in my estimates of the announcements effects, so in my study I only use "clean windows". In this case "clean windows" are 21-days event windows that don't overlap, ensuring that I only study the effects of one announcement in each event.[4]

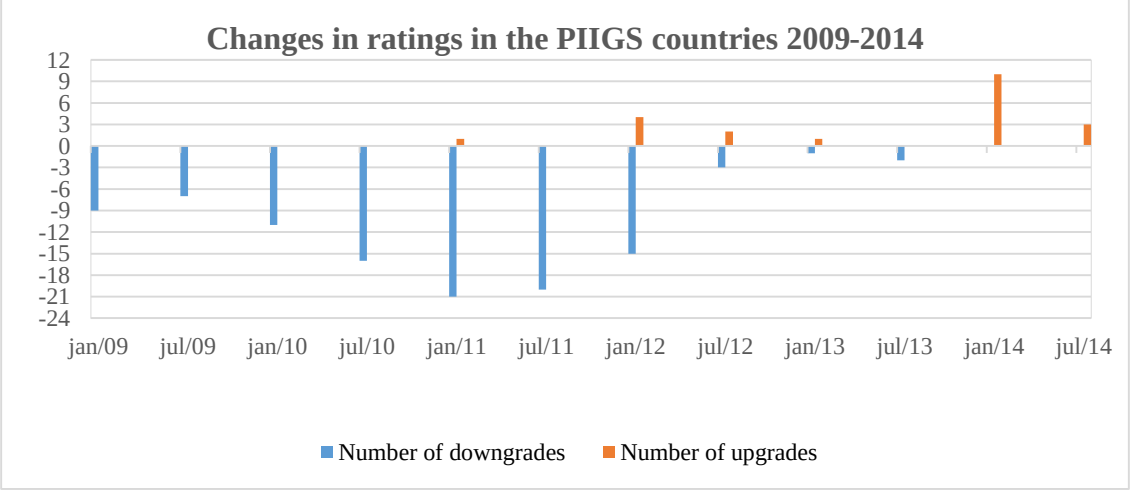

Figure 1- Re-ratings in the PIIGS countries during the period of January 2009 to September 2014, divided by semesters. The downgrades are showed in negative and the upgrades in positive.

[4] This method of decontamination was used previously on other studies (Kaminsky and Schmukler, 2002; Hooper et al. 2008).

This clustering of events was mainly caused by the procyclical behavior of the rating agencies. While in Greece and Ireland their bailout requests occurred in 2010 with the downgrades lagging after it, in the case of Portugal the bailout was in April 2011 (the semester with more events in the graphic) and the downgrades occurred in great number before and around the bailout increasing the pressure of investors in Portugal bond yields, snowballing borrowing costs, public deficit and debt. This worked as a self-fulfilling prophecy, placing rating agencies in the scope of public opinion being criticized by their role in aggravating the crisis in early 2011.

4. Event study methodology

Event studies are used as common framework for testing the immediate impact of a specific event on prices in the financial markets and its degree of significance.[5] In this paper I will employ this methodology to detect for abnormal returns around the announcements of the rating agencies.

I compute daily risk adjusted abnormal market returns from the conventional market model, which is considered to have the most powerful estimations and is the most common approach[6]:

$$AR_{it} = R_{it} - (\alpha_i + \beta_i R_{mt}),$$

where R_{it} is the return on market i at day t, R_{mt} is the return on the MSCI EU index at day t, and α_i and β_i are the market model parameters obtained from an ordinary least squares regression.

I calculate the market model parameters based on an estimation window that ranges from T_0=-120 to T_1= -21 trading days before the event day, t=0. The event window spans between t_1=-10 trading days before, to t_2=10 days after the event.[7] This will allow us to capture a possible anticipation of the announcement or a delayed reaction by the market.

[5] For a more comprehensive look on this methodology see MacKinlay (1997).
[6] MacKinlay (1997) presents the different models that can be applied on event studies
[7] I apply similar methodology to Brooks et al. (2004)

An average abnormal return is calculated for event date t as a simple cross-sectional average over N rating announcements in each country.

$$AAR_t = \frac{1}{N}\sum_{j=1}^{N} AR_{j,t},$$

where $AR_{j,t}$ is the abnormal return of event j on day t for each country. Subsequently I calculate the variance of AR for each event, which is based on the variance of AR during the estimation window, and is given by:

$$\sigma_{\epsilon_i}^2 = \frac{1}{T_1 - T_0 - 2}\sum_{t=T_0}^{T_1}\left(AR_{it} - \frac{\sum_{t=T_0}^{T_1} AR_{i,t}}{T_1 - T_0}\right)^2,$$

since I'm using "clean windows" and there's no overlapping the across the events:

$$VAR\,[AAR_T] = \frac{1}{N^2}\sum_{i=1}^{N}\sigma_{\epsilon_i}^2$$

Then I calculate the T-statistic under the hypothesis of no abnormal performance, assuming cross-sectional independence across the events.

A cumulative average abnormal return is then computed across the event window and the corresponding standard error:

$$CAAR_{t_1,t_2} = \sum_{t=t_1}^{t_2} AAR_t,$$

$$VAR\left[CAAR_{t_1,t_2}\right] = \sum_{t=t_1}^{t_2} VAR\,[AAR_T],$$

a T-statistic is then calculated assuming the hypothesis of the abnormal returns being zero. The individual average abnormal returns are assumed to be independent and identically distributed and by the central limit theorem the sample of AAR's will follow a normal distribution.

5. Empirical results

5.1. Analysis by country

I start my analysis of the effect of the rating announcements in the national stock markets of the PIIGS countries by plotting the graphic of cumulative abnormal returns (CARs) by both positive and negative announcements during my event window, to see how the market trends around the announcements (Figure 2):

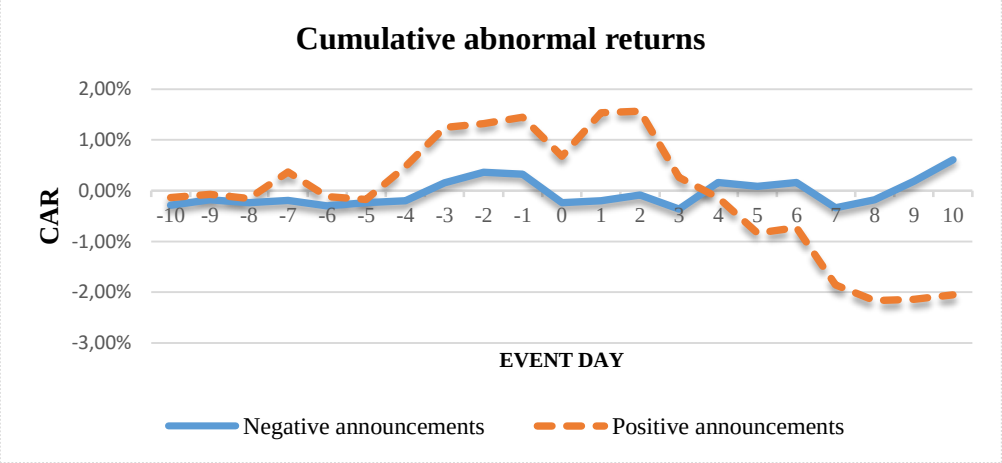

Figure 2 - Cumulative abnormal returns disaggregated between positive and negative announcements from event day -10 to event day 10. The abnormal returns were obtained using the market model for the normal return measure.

In the case of the negative announcements, there seems to be some degree of anticipation by the markets with a small decline on returns on the day before the event and greater drop on the event day. For the positive events, the market seems to have even a higher degree of anticipation with returns starting to rise five days before the event, then on the event day there's a drop followed by a new rise in returns and unexpectedly after day 3 the returns continue to fall until the last day of the event window leading to a highly negative CAR, this results seem to be driven by the returns of Portugal (shown on Table 4)

which influence largely the aggregated results because of the small size of the sample (13 events). Considering this I decided to plot the graph for positive announcements but this time without the data from Portugal upgrades, the results are shown on Figure 3. Analyzing the graphic it can be observed that until day 3 both graphics are similar but after that the data from Portugal ends up influencing the aggregated results producing very negative CARs on the last days of the event window. My results are consistent with Kaminsky and Schmukler (2002) and Brooks et al. (2004) who also found a negative reaction in the event day for negative announcements.

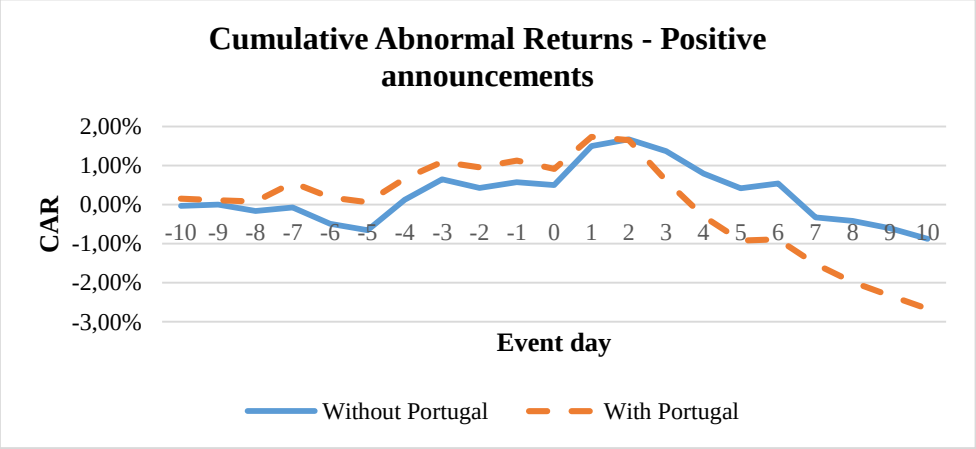

Figure 3 - Cumulative abnormal for the positive announcements from event day -10 to event day 10. The abnormal returns were obtained using the market model for the normal return measure. The full line contains the CAR excluding Portugal data and the dashed line

Figure 4 shows the CARs for negative announcements disaggregated by country. It can be observed a similar pattern across all countries around the event date with a substantial drop in returns in the event day (except for Italy, which doesn´t have any perceivable trend). After that, with the exception of Greece the market seems to "correct" with an increase in returns in the following days. But unexpectedly the positive trend continues, particularly after day 7, in all the countries with the exception of Greece leading to positive CARs, although not statistically significant this trend is unexpected but may be related to the characteristics of this crisis.

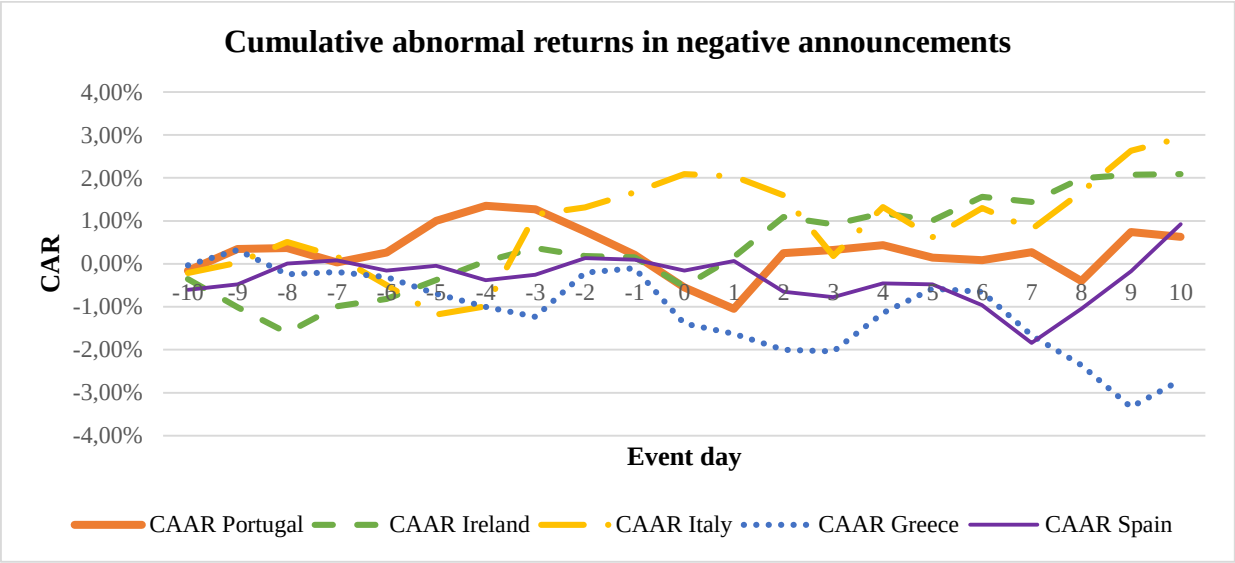

Figure 4 - Cumulative abnormal returns for negative announcements disaggregated by country from event day -10 to event day 10. The abnormal returns were obtained using the market model for the normal return measure

During this crisis downgrades were usually triggered by negative economic and budget predictions or political failure to implement corrective measures. Governments, in an attempt to halt the downward trend would then announce new corrective and economic measures to solve the problems and the markets would regain confidence and react positively, in this case on average after seven trading days, which would explain this positive trend. It would also make sense to why Greece is excluded from this tendency, since it was the country with least political consensus and would take more time for the Government to announce measures. Quite possibly there is a factor of trust, whereby the Greek government was discredited to such an event that the markets would not trust measures would be approved or applied. To be noted that I did not test for this effect, but recalling news following the rating announcement days reveal this trend of political response to the downgrades which had a lot of media attention during this period.

To analyze more thoroughly the effects of the rating announcements in the stock markets of each country, I will be looking to the daily average abnormal returns across the 21-day event window for both the negative and positive announcements as reported, respectively, in Table III and Table IV. As I mentioned previously in the Data section, there is uncertainty about the time of the events and if they could have effect only after the event

day. Considering my results I feel that this issue should not have a large effect on the returns (at least on downgrades), as it can be observed on Table III, e.g., Greece only has a significant market reaction on day zero. Examining the tables it can easily be perceived that there are clear differences in the "own-market" reaction between each country.

Portugal's market seems to have a high degree of anticipation in their rating downgrades, starting to have negative returns two days before the announcement, reaching its peak (-0.76%) on the event day, followed by a late reaction on the next day. In the second day following the announcement the market seems to start to return to normal levels with a significant positive abnormal return (1.30%) and reaching a positive CAAR. In the case of rating upgrades Portugal presents a negative return on the event day and significant negative returns on day 3 to 6 and day 8 and leading to significant negative CAARs after day 4. These results, as I previously stated end up influencing the aggregated results I calculated previously due to the small sample. Also the fact the sample is also very small for Portugal (3 events) makes me believe that this behavior of the abnormal returns is unrelated to the rating announcement and caused by other external factors.

Italy, which only has negative announcements on my study period, presents puzzling results, having a positive return on the event day but having progressively higher negative returns in day 1 and 2 and a significant negative abnormal return three days after the announcement (-1.29%). On day 4 there's a positive significant reaction on the next day to correct a possible "overreaction". This seems to indicate a somewhat late reaction of the market, possibly exacerbated by announcements after trading hours.

Ireland abnormal returns in the negative announcements present some anticipation of the announcement with negative returns on day -2 and -1 followed by a higher negative abnormal return on the event day with positive returns on the subsequent days, leading to a positive CAAR at the end of the event window. For the positive announcements there is a positive abnormal return on the event day followed by a higher positive reaction on the following day caused by a late reaction or possibly the timing of the announcements.

Greece is the country that presents the most significant reaction in the event day (-1.29%) for negative announcements, but unlike Portugal or Ireland it doesn't present any trend of anticipation which can explain the more severe reaction on the announcement day. Greece is also the only country in the sample that present a negative CAAR at the end of

the event window (-2.71%). For the positive announcements Greece presents positive returns from day -1 to day 1, indicating some anticipation to the upgrades.

Spain downgrades don't produce a significant reaction on the announcement day (-0.25%) only presenting a relative negative reaction two days after the event, but overall the rating downgrade doesn't seem to be very impactful on the Spanish national stock market. The rating upgrades produce a negative reaction on the event day followed by a positive reaction on the next two days, which seem to indicate a late reaction of the market or possibly the timing of the announcements.

I theorize that the reason beyond the results of Italy and Spain regarding the downgrades (which do not have a large impact on the event day), is the fact that the ratings of these two countries were never under the Investment-grade level, which like I commented on earlier may have a huge effect on demand of financial products of the country and consequently on prices.

5.2. Analysis by rating agencies

Rating agencies report that they utilize several factors to determine the sovereign ratings of the countries, but they are all very similar between each other and theoretically there should be no differences between the effects that each other's announcements produce in the countries "own-market" wealth, but previous literature (see Brooks et al. (2004) has found differences between how different agencies announcements affect the markets so I decided to conduct and analysis by rating agency to see if I would find similar results. My results are reported on Figure 5, which plots the cumulative abnormal returns by rating agencies for the negative announcements, and Table V that shows the average abnormal returns across the event window by rating agency for both positive and negative events.

Table III - Average Abnormal returns across the event window by country (negative announcements)

Event day	Negative announcements																			
	Portugal				Italy				Ireland				Greece				Spain			
	AAR	t-stat	CAAR	t-stat	AAR	t-stat	CAAR	t-stat	AAR	t-stat	CAAR	t-stat	AAR	t-stat	CAAR	t-stat	AAR	t-stat	CAAR	t-stat
-10	-0,16%	-0,33	-0,16%	-0,33	-0,21%	-0,32	-0,21%	-0,32	-0,35%	-0,58	-0,35%	-0,58	-0,03%	-0,06	-0,03%	-0,06	-0,60%	-1,14	-0,60%	-1,14
-9	0,50%	1,03	0,34%	0,50	0,24%	0,36	0,03%	0,03	-0,66%	-1,08	-1,01%	-1,17	0,36%	0,63	0,33%	0,41	0,13%	0,24	-0,48%	-0,64
-8	0,03%	0,06	0,37%	0,44	0,48%	0,72	0,51%	0,44	-0,60%	-0,99	-1,61%	-1,53	-0,57%	-1,01	-0,24%	-0,25	0,48%	0,91	0,01%	0,01
-7	-0,34%	-0,70	0,03%	0,03	-0,34%	-0,51	0,17%	0,12	0,62%	1,02	-0,99%	-0,81	0,06%	0,10	-0,19%	-0,17	0,08%	0,14	0,08%	0,08
-6	0,23%	0,48	0,26%	0,24	-0,66%	-0,99	-0,49%	-0,33	0,18%	0,29	-0,82%	-0,60	-0,12%	-0,22	-0,31%	-0,25	-0,24%	-0,45	-0,16%	-0,13
-5	0,74%	1,51	1,00%	0,84	-0,69%	-1,03	-1,18%	-0,72	0,44%	0,72	-0,38%	-0,25	-0,39%	-0,69	-0,70%	-0,50	0,11%	0,21	-0,05%	-0,04
-4	0,35%	0,71	1,35%	1,04	0,20%	0,29	-0,98%	-0,56	0,44%	0,72	0,06%	0,04	-0,30%	-0,53	-1,00%	-0,67	-0,33%	-0,63	-0,38%	-0,27
-3	-0,08%	-0,17	1,27%	0,92	2,14%	3,21**	1,15%	0,61	0,31%	0,51	0,37%	0,22	-0,23%	-0,41	-1,23%	-0,77	0,13%	0,24	-0,25%	-0,17
-2	-0,51%	-1,04	0,76%	0,52	0,16%	0,24	1,32%	0,66	-0,19%	-0,31	0,18%	0,10	1,03%	1,81*	-0,21%	-0,12	0,38%	0,72	0,13%	0,08
-1	-0,55%	-1,12	0,21%	0,14	0,35%	0,52	1,66%	0,79	-0,03%	-0,05	0,15%	0,08	0,11%	0,19	-0,10%	-0,05	-0,03%	-0,06	0,10%	0,06
0	-0,76%	-1,55	-0,55%	-0,34	0,43%	0,64	2,09%	0,95	-0,68%	-1,12	-0,53%	-0,26	-1,29%	-2,28**	-1,39%	-0,74	-0,25%	-0,48	-0,15%	-0,09
1	-0,50%	-1,03	-1,05%	-0,62	-0,06%	-0,09	2,03%	0,88	0,69%	1,13	0,16%	0,08	-0,24%	-0,43	-1,63%	-0,83	0,22%	0,42	0,07%	0,04
2	1,30%	2,66**	0,25%	0,14	-0,43%	-0,65	1,60%	0,67	0,93%	1,53	1,09%	0,50	-0,38%	-0,66	-2,00%	-0,98	-0,72%	-1,35	-0,65%	-0,34
3	0,07%	0,15	0,32%	0,18	-1,42%	-2,13*	0,18%	0,07	-0,17%	-0,27	0,92%	0,40	-0,04%	-0,07	-2,04%	-0,96	-0,13%	-0,24	-0,78%	-0,39
4	0,12%	0,24	0,44%	0,23	1,14%	1,71*	1,32%	0,51	0,26%	0,42	1,18%	0,50	0,90%	1,59	-1,14%	-0,52	0,32%	0,61	-0,45%	-0,22
5	-0,29%	-0,60	0,15%	0,07	-0,70%	-1,05	0,62%	0,23	-0,17%	-0,28	1,01%	0,41	0,56%	0,99	-0,58%	-0,26	-0,03%	-0,05	-0,48%	-0,23
6	-0,06%	-0,13	0,08%	0,04	0,68%	1,02	1,30%	0,47	0,55%	0,90	1,56%	0,62	-0,07%	-0,12	-0,65%	-0,28	-0,48%	-0,91	-0,96%	-0,44
7	0,19%	0,39	0,27%	0,13	-0,50%	-0,74	0,81%	0,28	-0,12%	-0,20	1,44%	0,56	-1,02%	-1,79*	-1,67%	-0,69	-0,88%	-1,66*	-1,84%	-0,82
8	-0,67%	-1,38	-0,40%	-0,19	0,87%	1,30	1,67%	0,58	0,55%	0,91	1,99%	0,75	-0,69%	-1,22	-2,36%	-0,96	0,79%	1,50	-1,05%	-0,45
9	1,14%	2,33**	0,74%	0,34	0,96%	1,44	2,63%	0,88	0,09%	0,14	2,08%	0,76	-0,97%	-1,72*	-3,33%	-1,32	0,88%	1,66*	-0,17%	-0,07
10	-0,11%	-0,23	0,63%	0,41	0,30%	0,44	2,93%	1,39	0,01%	0,02	2,09%	1,09	0,62%	1,10	-2,71%	-1,51	1,09%	2,06**	0,92%	0,55

Table III - This table reports average abnormal returns (AAR) and cumulative average abnormal returns (CAAR) computed through the market model as a benchmark for normal returns and their statistical significance, across the whole event window and disaggregated by each of the 5 countries of the sample for negative announcements.

* Denotes statistical significance at the 10% level

** Denotes statistical significance ate the 5% level

Table IV - Average Abnormal returns across the event window by country (positive announcements)

Event day	Positive announcements															
	Portugal				Ireland				Greece				Spain			
	AAR	t-stat	CAAR	t-stat	AAR	t-stat	CAAR	t-stat	AAR	t-stat	CAAR	t-stat	AAR	t-stat	CAAR	t-stat
-10	0,76%	1,27	0,76%	1,27	0,02%	0,03	0,02%	0,03	-0,34%	-0,35	-0,34%	-0,35	0,46%	0,67	0,46%	0,67
-9	-0,29%	-0,48	0,47%	0,56	0,64%	1,04	0,66%	0,76	0,07%	0,07	-0,26%	-0,19	-1,26%	-1,84	-0,80%	-0,83
-8	0,42%	0,70	0,90%	0,86	0,72%	1,17	1,39%	1,29	-1,04%	-1,07	-1,30%	-0,78	-0,19%	-0,28	-0,99%	-0,84
-7	1,77%	2,93**	2,66%	2,21**	-0,82%	-1,32	0,57%	0,46	1,17%	1,21	-0,13%	-0,07	-0,23%	-0,34	-1,23%	-0,90
-6	-0,23%	-0,39	2,43%	1,80*	0,46%	0,74	1,02%	0,74	-1,29%	-1,34	-1,42%	-0,66	-0,43%	-0,62	-1,65%	-1,08
-5	0,04%	0,06	2,46%	1,67*	-0,42%	-0,69	0,60%	0,39	-0,43%	-0,44	-1,85%	-0,78	0,87%	1,27	-0,78%	-0,47
-4	0,04%	0,07	2,51%	1,57	1,07%	1,73*	1,67%	1,02	0,90%	0,93	-0,95%	-0,37	-0,06%	-0,08	-0,84%	-0,47
-3	0,06%	0,10	2,57%	1,51	0,23%	0,37	1,90%	1,08	0,99%	1,02	0,03%	0,01	0,22%	0,33	-0,62%	-0,32
-2	0,16%	0,26	2,73%	1,51	-0,24%	-0,38	1,66%	0,90	-0,27%	-0,28	-0,24%	-0,08	-0,11%	-0,16	-0,72%	-0,35
-1	0,24%	0,40	2,97%	1,56	-0,83%	-1,34	0,83%	0,42	1,14%	1,18	0,91%	0,30	0,10%	0,15	-0,62%	-0,29
0	-0,71%	-1,17	2,26%	1,13	0,18%	0,29	1,01%	0,49	0,06%	0,06	0,97%	0,30	-0,81%	-1,19	-1,44%	-0,63
1	0,24%	0,40	2,50%	1,20	0,88%	1,42	1,89%	0,88	1,32%	1,37	2,29%	0,68	0,57%	0,84	-0,86%	-0,36
2	-0,92%	-1,53	1,58%	0,73	-0,01%	-0,01	1,88%	0,84	0,03%	0,03	2,32%	0,67	0,82%	1,20	-0,04%	-0,02
3	-3,46%	-5,74**	-1,88%	-0,83	0,16%	0,26	2,04%	0,88	-0,80%	-0,83	1,52%	0,42	-0,22%	-0,33	-0,27%	-0,10
4	-2,07%	-3,43**	-3,94%	-1,69*	0,85%	1,37	2,89%	1,20	-2,13%	-2,21	-0,61%	-0,16	-0,33%	-0,48	-0,59%	-0,22
5	-1,43%	-2,38**	-5,37%	-2,23**	-0,85%	-1,38	2,03%	0,82	0,09%	0,10	-0,51%	-0,13	-0,36%	-0,52	-0,95%	-0,35
6	-0,25%	-0,42	-5,62%	-2,27**	0,02%	0,04	2,05%	0,80	0,90%	0,93	0,38%	0,10	-1,25%	-1,82	-2,19%	-0,78
7	0,14%	0,23	-5,48%	-2,15**	0,53%	0,85	2,58%	0,98	-3,10%	-3,21	-2,72%	-0,66	0,83%	1,21	-1,37%	-0,47
8	-1,72%	-2,86**	-7,21%	-2,75**	0,18%	0,29	2,76%	1,02	-1,00%	-1,03	-3,71%	-0,88	1,17%	1,71	-0,20%	-0,07
9	-0,86%	-1,43	-8,07%	-3,00**	0,14%	0,22	2,90%	1,05	-0,52%	-0,54	-4,23%	-0,98	-0,16%	-0,24	-0,36%	-0,12
10	-0,55%	-0,91	-8,62%	-4,52**	-0,48%	-0,77	2,42%	1,24	0,01%	0,01	-4,22%	-1,38	-0,41%	-0,60	-0,77%	-0,36

Table IV- This table reports average abnormal returns (AAR) and cumulative average abnormal returns (CAAR) computed through the market model as a benchmark for normal returns and their statistical significance, across the whole event window and disaggregated by each of the 5 countries of the sample for positive announcements.

* Denotes statistical significance at the 10% level

** Denotes statistical significance ate the 5% level

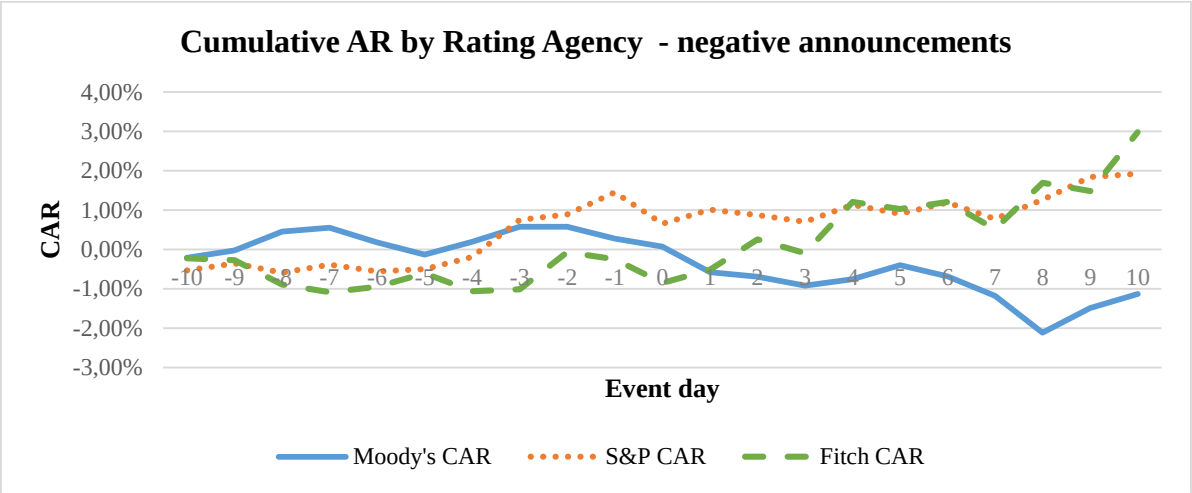

Figure 5 - Cumulative abnormal returns for negative announcements disaggregated by rating agencies from event day -10 to event day 10. The abnormal returns were obtained using the market model for the normal return measure

Analyzing Figure 5 we can see that Moody's has a clear "anticipation" trend, with returns starting two days before the announcement and continuing to drop until day 3. On the other side of the spectrum, S&P and Fitch announcements don't show any anticipation by the markets or late reaction, only dropping on the event day, then in the last days of the event window their CAR's start to rise and finish with high positive values (with Fitch's value being statistically significant on day 10). I believe, as I previously stated, that this may be caused by the fact that during this crisis downgrades were usually triggered by negative economic and budget predictions or political failure of corrective measures, Governments aware of this and to respond to the growing instability would then announcement new corrective and economic measures to solve the problems and the markets would regain confidence and react positively, in this case on average after seven trading days, which would explain this positive trend. Again, to be noted that I didn´t test for this effect but seems like an explanation that may fit these results.

Regarding Table 5, in the case of the negative announcements, only S&P ratings produce a significant abnormal return on the event (-0.80%), while in the case of Fitch the reaction is negative but not significant. In the case of Moody's there seems to be an anticipation of the announcement on the day before, followed by a larger reaction on day 1 caused by a late reaction or the timing of the announcements.

Table V - Average Abnormal returns across the event window by Rating Agency

Event day	Negative announcements												Positive announcements											
	Moody's				S&P				Fitch				Moody's				S&P				Fitch			
	AAR	t-stat	CAAR	t-stat	AAR	t-stat	CAAR	t-stat	AAR	t-stat	CAAR	t-stat	AAR	t-stat	CAAR	t-stat	AAR	t-stat	CAAR	t-stat	AAR	t-stat	CAAR	t-stat
-10	-0,21%	-0,50	-0,21%	-0,50	-0,53%	-1,30	-0,53%	-1,30	-0,22%	-0,40	-0,22%	-0,40	0,33%	0,75	0,33%	0,75	0,71%	0,79	0,71%	0,79	-0,63%	-0,86	-0,63%	-0,86
-9	0,19%	0,45	-0,02%	-0,04	0,18%	0,45	-0,35%	-0,61	-0,05%	-0,08	-0,27%	-0,34	-0,32%	-0,75	0,00%	0,00	0,76%	0,85	1,47%	1,16	-0,49%	-0,66	-1,12%	-1,08
-8	0,48%	1,14	0,46%	0,63	-0,24%	-0,58	-0,59%	-0,83	-0,62%	-1,09	-0,89%	-0,91	0,21%	0,48	0,21%	0,28	0,42%	0,47	1,89%	1,22	-0,77%	-1,05	-1,89%	-1,49
-7	0,09%	0,22	0,55%	0,65	0,20%	0,49	-0,39%	-0,48	-0,19%	-0,34	-1,08%	-0,95	0,56%	1,29	0,77%	0,88	0,23%	0,25	2,12%	1,18	0,63%	0,86	-1,26%	-0,86
-6	-0,37%	-0,88	0,18%	0,19	-0,17%	-0,41	-0,55%	-0,61	0,14%	0,25	-0,94%	-0,74	0,28%	0,65	1,05%	1,08	0,00%	0,00	2,12%	1,06	-1,58%	-2,15	-2,84%	-1,73*
-5	-0,31%	-0,73	-0,13%	-0,13	0,06%	0,14	-0,50%	-0,50	0,34%	0,59	-0,61%	-0,44	-0,25%	-0,58	0,80%	0,75	0,28%	0,31	2,40%	1,09	-0,35%	-0,48	-3,19%	-1,77*
-4	0,32%	0,76	0,19%	0,17	0,30%	0,75	-0,19%	-0,18	-0,45%	-0,80	-1,06%	-0,70	0,12%	0,28	0,92%	0,80	0,59%	0,66	2,99%	1,26	1,23%	1,67*	-1,96%	-1,01
-3	0,39%	0,92	0,58%	0,49	0,95%	2,32**	0,75%	0,65	0,05%	0,09	-1,01%	-0,63	-0,13%	-0,29	0,79%	0,65	-0,54%	-0,60	2,46%	0,97	2,07%	2,81*	0,10%	0,05
-2	-0,01%	-0,01	0,57%	0,45	0,13%	0,33	0,89%	0,73	0,94%	1,65	-0,07%	-0,04	-0,15%	-0,35	0,64%	0,49	0,09%	0,10	2,54%	0,95	-0,33%	-0,45	-0,23%	-0,10
-1	-0,29%	-0,70	0,28%	0,21	0,57%	1,40	1,46%	1,13	-0,18%	-0,31	-0,25%	-0,14	-0,46%	-1,06	0,18%	0,13	-0,23%	-0,25	2,31%	0,82	1,34%	1,83*	1,11%	0,48
0	-0,21%	-0,50	0,07%	0,05	-0,80%	-1,96**	0,66%	0,49	-0,60%	-1,06	-0,84%	-0,45	-0,49%	-1,13	-0,31%	-0,22	-0,39%	-0,44	1,92%	0,65	0,31%	0,42	1,43%	0,58
1	-0,65%	-1,53	-0,58%	-0,39	0,36%	0,88	1,02%	0,72	0,33%	0,59	-0,51%	-0,26	0,85%	1,97**	0,54%	0,36	0,00%	0,00	1,92%	0,62	1,60%	2,18**	3,02%	1,19
2	-0,12%	-0,28	-0,69%	-0,46	-0,14%	-0,34	0,88%	0,60	0,77%	1,35	0,25%	0,12	-0,42%	-0,98	0,12%	0,07	-0,62%	-0,69	1,31%	0,40	0,89%	1,21	3,91%	1,48
3	-0,23%	-0,54	-0,92%	-0,58	-0,17%	-0,43	0,70%	0,46	-0,35%	-0,61	-0,09%	-0,04	-1,23%	-2,84**	-1,12%	-0,69	-2,23%	-2,49**	-0,92%	-0,28	0,42%	0,58	4,34%	1,58
4	0,17%	0,40	-0,75%	-0,46	0,43%	1,07	1,14%	0,72	1,30%	2,29**	1,21%	0,55	-1,43%	-3,30**	-2,55%	-1,52	-0,71%	-0,79	-1,63%	-0,47	-0,49%	-0,67	3,84%	1,35
5	0,36%	0,84	-0,40%	-0,23	-0,23%	-0,57	0,91%	0,56	-0,18%	-0,32	1,03%	0,45	-1,27%	-2,92**	-3,82%	-2,20**	0,26%	0,29	-1,37%	-0,38	-0,69%	-0,94	3,15%	1,07
6	-0,28%	-0,67	-0,68%	-0,39	0,29%	0,71	1,19%	0,71	0,18%	0,32	1,21%	0,52	-0,56%	-1,30	-4,38%	-2,45**	0,50%	0,56	-0,87%	-0,24	0,31%	0,43	3,46%	1,14
7	-0,50%	-1,17	-1,17%	-0,66	-0,41%	-1,02	0,78%	0,45	-0,69%	-1,21	0,52%	0,22	0,62%	1,43	-3,76%	-2,04**	-1,50%	-1,68*	-2,37%	-0,62	-1,33%	-1,81*	2,14%	0,68
8	-0,94%	-2,22**	-2,11%	-1,15	0,48%	1,19	1,26%	0,71	1,18%	2,07**	1,70%	0,68	-0,74%	-1,72*	-4,50%	-2,38**	-1,23%	-1,38	-3,60%	-0,92	0,64%	0,87	2,77%	0,87
9	0,63%	1,49	-1,48%	-0,79	0,58%	1,42	1,84%	1,01	-0,21%	-0,37	1,48%	0,58	-0,56%	-1,29	-5,06%	-2,61**	-0,98%	-1,10	-4,58%	-1,15	0,57%	0,78	3,34%	1,02
10	0,35%	0,83	-1,13%	-0,85	0,08%	0,20	1,92%	1,49	1,50%	2,63**	2,98%	1,66*	-0,66%	-1,53	-5,73%	-4,17**	-0,70%	-0,78	-5,28%	-1,87*	0,45%	0,61	3,79%	1,63

Table V- This table reports average abnormal returns (AAR) and cumulative average abnormal returns (CAAR) computed through the market model as a benchmark for normal returns and their statistical significance, across the whole event window and disaggregated by rating agency and for positive and negative announcements.

* Denotes statistical significance at the 10% level

** Denotes statistical significance ate the 5% level

For positive announcements there are also differences between the agencies, with S&P not producing any discernible reaction in the market around the event for negative downgrades, while Moody's and Fitch announcements producing a significant reaction on the day after the event. In the case of Moody's and considering the results for the negative announcements that finds a larger reaction on day 1 as well, I´m inclined to believe that Moody's generally announces the rating changes close to the end of the trading hours or even after the trading closes. Even though my research didn't reveal any specific time by any agency to do the announcement, this explanation for this case is more consistent with my results.

My results are consistent with Brooks et al. (2004) which finds different reactions by the market based on the agency that subscribed the announcement, they find that S&P and Fitch downgrades produced larger market downfalls than the other agencies. I concluded like them that S&P downgrades produce more significant market downfalls, but my results differ from their work since Fitch didn't produce a significant market reaction in my results.

5.3. Greece "contagion" study

During the crisis one of the main concerns of the political authorities and the investors were the possible "contagion" of the political and economic situation that subsisted in Greece to other European countries, particularly the countries that were also under financial assistance, Portugal and Ireland. Considering this issue I decided to study the effects of Greece downgrade announcements on the stock markets of the countries that theoretically should be more "sensitive" to them, Portugal and Ireland, but only in the period after the Greek bailout, when the issue of contagion was brought up by the markets and European political authorities. I decided to only study the effect of negative announcements, since previous literature (see Ferreira and Gama (2007), concluded that rating upgrades did not have significant effect on foreign countries. I used event studies, as formerly used in Kaminsky & Schmukler (2002), with the same methodology I apply on the rest of my paper. I start my analysis by plotting the graphic of cumulative abnormal returns for Portugal, Ireland and a dashed line with Greece own-market reaction, to the post-bailout negative announcements (Fig. 6).

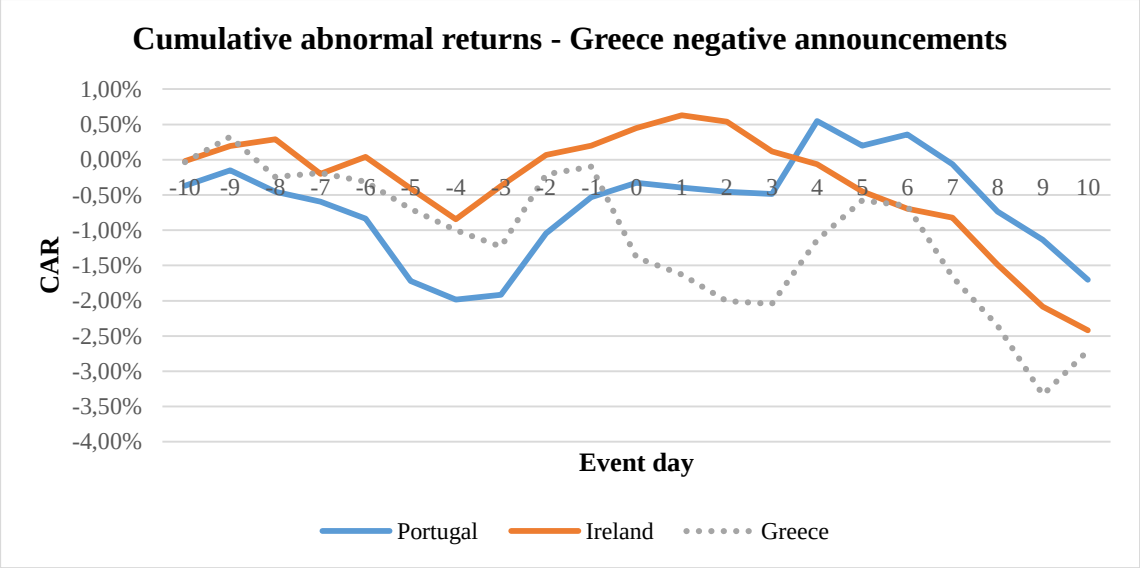

Figure 6 - Cumulative abnormal returns for Greece downgrades, in the own country (dotted line), Portugal and Ireland. The abnormal returns were obtained using the market model for the normal return measure.

Analyzing the results of Portugal and comparing them to Greece own-market reaction, we can see that the Greek downgrades are not very impactful in the Portuguese national stock market, only with a small decrease in returns after day 1 until day 3. Concerning Ireland the results show even less impact by the downgrades in the Irish market, with no perceivable trend around the event and even an increase of returns in the days around the event.

For a more detailed analysis of the effects of Greek downgrades on the Portuguese and Irish markets, I will analyze the average abnormal returns (AAR's) across the 21-day event window reported in Table 6.

The Portuguese market does not show strong reaction to the Greek downgrades, having positive abnormal returns on the day of the event, followed by a small decrease in returns in the following days although not significant. The Irish market also doesn't seem to suffer any impact by the downgrades in the fellow European country, showing a positive return on the event day and the next day, followed by negative abnormal returns in the following days but again not statistically significant.

Table VI - Average abnormal returns for Greece negative announcements in Portugal and Ireland

Event day	Greece negative announcements							
	Portugal				Ireland			
	AAR	t-stat	CAAR	t-stat	AAR	t-stat	CAAR	t-stat
-10	-0,37%	-0,90	-0,37%	-0,90	-0,02%	-0,04	-0,02%	-0,04
-9	0,21%	0,53	-0,15%	-0,26	0,21%	0,50	0,20%	0,33
-8	-0,30%	-0,75	-0,46%	-0,65	0,10%	0,23	0,29%	0,40
-7	-0,14%	-0,34	-0,59%	-0,73	-0,49%	-1,16	-0,20%	-0,24
-6	-0,24%	-0,60	-0,84%	-0,92	0,24%	0,57	0,04%	0,04
-5	-0,88%	-2,17**	-1,72%	-1,73*	-0,45%	-1,06	-0,41%	-0,39
-4	-0,26%	-0,65	-1,98%	-1,85*	-0,44%	-1,03	-0,84%	-0,75
-3	0,07%	0,16	-1,92%	-1,67*	0,47%	1,12	-0,37%	-0,31
-2	0,87%	2,15**	-1,05%	-0,86	0,44%	1,03	0,07%	0,05
-1	0,51%	1,26	-0,53%	-0,42	0,13%	0,31	0,20%	0,15
0	0,20%	0,50	-0,33%	-0,24	0,25%	0,59	0,45%	0,32
1	-0,07%	-0,17	-0,40%	-0,28	0,18%	0,43	0,63%	0,43
2	-0,06%	-0,15	-0,46%	-0,31	-0,09%	-0,22	0,54%	0,35
3	-0,03%	-0,08	-0,49%	-0,32	-0,42%	-0,99	0,12%	0,07
4	1,04%	2,55**	0,55%	0,35	-0,18%	-0,43	-0,07%	-0,04
5	-0,35%	-0,86	0,20%	0,12	-0,38%	-0,91	-0,45%	-0,27
6	0,16%	0,39	0,36%	0,21	-0,25%	-0,58	-0,70%	-0,40
7	-0,42%	-1,04	-0,06%	-0,04	-0,13%	-0,30	-0,82%	-0,46
8	-0,67%	-1,66*	-0,74%	-0,42	-0,66%	-1,57	-1,49%	-0,81
9	-0,40%	-0,98	-1,13%	-0,62	-0,60%	-1,41	-2,08%	-1,10
10	-0,57%	-1,40	-1,70%	-1,33	-0,34%	-0,79	-2,42%	-1,81*

Table 6 - This table reports average abnormal returns (AAR) and cumulative average abnormal returns (CAAR) computed through the market model as a benchmark for normal returns and their statistical significance, across the whole event window and disaggregated by rating agency and for positive and negative announcements.

* Denotes statistical significance at the 10% level

** Denotes statistical significance ate the 5% level

These results are surprising given that previous literature (see Ferreira and Gama (2007) and Kaminsky & Schmukler (2002) found that rating downgrades in one country spilled over to other markets, and that the results were stronger for neighboring countries and undeveloped economies (conditions that don't apply in this case), the fact that these countries share the same currency and belong to a "single" economic area should compensate for this fact. Also the fact that these countries shared financial assistance and the same economic problems (high deficit, high debt and recession) in which the performance of one country could impact directly the political and economic measures taken in the other ones, increases my surprise with these results. Effectively, my results show that the downgrades on Greece debt did not produce any effect on the stock markets of Portugal and Greece (government bond yields could be a different issue) and the contagion risk that was so discussed by political authorities, the "markets" and the media did not really exist (at least on the stock markets).

6. Conclusions

In this paper I study the "own-market" impact of sovereign rating changes from the three main agencies Moody's, S&P and Fitch in the PIIGS countries (Portugal, Italy, Ireland, Greece and Spain) during the European sovereign debt crisis using standard event study methodology. While the impact of sovereign rating changes and their effect on the stock markets has already been in the scope of past literature, my paper focuses on a group of countries with unusually high debt and persistent public deficits during a sovereign debt crisis which is a period where the sovereign ratings gain special importance. To complete my paper I also study the impact of Greek debt downgrades in the other two countries of this group (Portugal and Ireland) that were or would eventually be under financial assistance to check for possible contagion effects on their national stock markets.

First, my results show that negative announcements only produce a significant effect on the event day in Greek own-market returns and that even though not statistically significant, there is a strong but not statistically significant effect on returns in Portugal and Ireland around the event day with an anticipation of the event by the stock market, which may have weakened the impact in the day of the announcement. The reaction seems to be somewhat less severe in the case of Italy and Spain, I believe that this was caused by the fact that unlike the other three countries, the ratings of Italy and Spain were never under the Investment-grade level, which may have a significant effect on demand of financial products of the country and consequently on prices, resulting on a minor impact in these two countries. Second, upgrades do not seem to produce any significant effect on the event day in any of the countries, although Ireland and Greece returns show some positive but not statistically significant reaction on the following day. Third, I found that only S&P downgrades produce a significant market reaction on the event day, even though the other agencies ratings seem to also have an effect on the stock markets (Moody's particularly on the following day). In the case of the upgrades I found that Moody's and Fitch produce a statistically significant reaction but only on the day following the announcement, this allied with previous results made me question the timing of the announcements, particularly in the case of Moody's which seems to make the announcements after or close to the end of the trading day. Fourth, I investigated the effect of rating downgrades of Greece in Portuguese

and Irish markets and I found that these announcements do not produce any discernible effect on these countries' stock markets.

Future research on this topic could focus to the analysis of the countries characteristics vs rating effects, i.e. see if and how the Debt level, Predicted public deficit, inflation, unemployment, sovereign rating tier and other economic factors cause different interactions in the way rating announcements affect that countries' stock market. This may indicate more precisely why there are differences in the way Italy and Spain reacted to the announcements compared to Portugal, Ireland and Greece. Moreover, future studies on this crisis could check if there are particular differences in the way this group of countries reacted to the announcements before and during the crisis to see, like past research (Kaminsky and Schmukler (2002), Pukthuanthong-Le et al. (2007) and Hooper et al. (2008), if the rating agencies helped exacerbate the economic cycle in this crisis. Last of all, studies on the determinants of the ratings and a "study" of reputation, may help to clarify why the markets react so differently to the announcements depending on the agency that subscribes them.

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