**ERASMUS UNIVERSITY ROTTERDAM**

**Master Thesis**

To obtain the academic degree of

Master of Science in Economics & Business

(Major in International Economics)

**Information Availability Influences the Impact of Rating Events on Sovereign Bond Markets**

*Erasmus School of Economics*

*Department of Economics*

**Author:** Anna Eleonora (Anneloor) Hoebée

**Exam Number:** 348301

**Email address:** aehoebee@gmail.com

**Supervisor:** B.M. Sadaba, MSc

**Study Program:** Business Economics

**Specialization:** International Economics

**Date:** 24/6/2013

**Abstract**

Much of the previous literature over the past decade has shown that negative rating events have a significant impact on sovereign bond spreads. However, in this thesis I show that, when accounting for freedom of press and the level of transparency in a country, the statistical significance of rating events decreases or even disappears. Thus, I argue that it is information availability which is crucial for the efficiency of financial markets. So when information is not always available and transparency is thus low, market participants are more dependent upon credit rating events to make their investment decisions. A rating event is therefore expected to have a significant impact in countries with little information availability, while no impact is expected in countries with ample information availability. I find evidence of this as the significant impact of positive rating events ceases and the impact of negative rating events decreases after accounting for information availability. Effects of rating events remain only significant for sovereign 5-year maturity bond spreads although muted, while 1- and 10-year bonds are no longer significantly affected. Finally, by accounting for the influence of the recent financial crisis, I find that the impact of negative rating events on sovereign bond markets becomes even more decreased. This shows that markets tend to have larger spreads in times of a crisis.

**Acknowledgement**

I greatly appreciate the help of Myrthe Palmboom, who, when I got frustrated or stuck, always found a way to get me going again and start again with refreshed energy. Also, I would like to thank my friends who had to endure my broad explanations on my subject which is not their but nevertheless were there for me to listen. Last but not least, I am grateful to my parents who supported and encouraged me whenever I needed it; who were patient and loving whenever I got lost and who always have an inexhaustible faith in my abilities to succeed in the things I set out to do. It has been a long journey and with your help it has now come to an end.

Table of Content

[1. Introduction 5](#_Toc359926542)

[2. Literature review 6](#_Toc359926543)

[2.1 Predictability of rating events 7](#_Toc359926544)

[2.2 Rating events during crises 8](#_Toc359926545)

[2.3 The influence of rating events on non-sovereign yields 10](#_Toc359926546)

[2.4 The influence of rating events on sovereign yields 10](#_Toc359926547)

[2.5 Information availability 11](#_Toc359926548)

[2.6 Transparency 13](#_Toc359926549)

[2.7 Conformity between the various studies 14](#_Toc359926550)

[2.8 Contagion 15](#_Toc359926551)

[3. Hypotheses 15](#_Toc359926552)

[4. Methodology 17](#_Toc359926553)

[4.1 Data 18](#_Toc359926554)

[4.2 Description of the data 22](#_Toc359926555)

[5. Empirical model 22](#_Toc359926556)

[6. Results 24](#_Toc359926557)

[6.1 Description of the results 25](#_Toc359926558)

[6.2 Analysis of the results 27](#_Toc359926559)

[7. Conclusion 31](#_Toc359926560)

[8. Discussion 32](#_Toc359926561)

[APPENDIX A 34](#_Toc359926562)

[APPENDIX B 35](#_Toc359926563)

[References 38](#_Toc359926564)

# ***1. Introduction***

This thesis looks at the impact of rating events on sovereign bond yield spreads after controlling for information availability. Credit rating agencies (CRAs) rate countries to create a comparison between countries. They construct their ratings from publicly available information. These ratings represent how the country is currently assessed. Countries are also assigned an outlook which can be positive, stable or negative. Apart from that, countries can be placed on a watchlist, which means that the country’s rating is under review to be either up- or downgraded. Changes in ratings and outlooks or when placed on the watchlist are different types of rating events. The rating events are lagged, namely, they contain no new information and should therefore have no influence on the financial markets.[[1]](#footnote-1) Lots of research, which will be discussed in the next section, has been done to find out whether or not rating events have significant impact on bond markets.

The dependent variable in this study are the 1-, 5- and 10-year maturity sovereign bond yield spreads. By the use of empirical models, the goal is to explore if after controlling for information availability, the impact of rating events on yield spreads disappears or at least significantly decreases. I use the ratings of the three largest and most influential CRAs in the world: Fitch, Moody’s and Standard & Poor’s (S&P).

Earlier studies by Radelet et al. (1998) and Bhatia (2002) have shown that CRAs tend to overreact during crises, creating panic and thereby speed up or deepen the crisis. This thesis shows that whether or not there is a crisis, there should be no significant reaction in the bond markets following a rating event if information is publicly available. The highlights of the findings are that accounting for information availability, by the use of variables for the level of transparency and the amount of freedom of press lowers the impact of rating events on bond spreads and that accounting for the crisis further limits the wideness of the spreads, i.e. in times of crisis markets the spreads are wider. The findings further show that positive rating events no longer have any significant influence but negative rating events still do on 5-year maturity sovereign bond spreads. All other maturities are no longer significantly influenced by these events. The variable for freedom of press is significant for estimating yield spreads whereas the variable measuring the level of transparency is not, i.e. the amount of corruption present in a country, does not seem to significantly influence sovereign bond yield spreads. However, the goal of this study is to test if, by accounting for information availability, the impact of rating events on yield spreads would cease or at least decrease and results show that this is indeed the case.

# *2. Literature review*

In this section I present a broad overview of literature concerning credit rating agencies (CRAs) and their impact on bond markets. The three most influential CRAs are Moody’s Investors Service (Moody’s), Standard & Poor’s (S&P) and Fitch Ratings (Fitch). Compared to company credit rating, sovereign credit rating is relatively young. Only since the 1980’s, countries outside the USA and Canada are being rated and since the 1990’s also emerging markets. Between 2000 and now, most third world countries started to be rated as well. In most cases, the sovereign credit rating can be seen as the country’s ‘ceiling’, meaning that domestic companies do not have ratings exceeding the sovereign’s. Around 40% of all bonds issued are sovereigns, leading to demand for an internationally accepted benchmark to help with investment decisions. The issuer pays a fee for its rating to have an internationally respected ‘seal of approval’.[[2]](#footnote-2) S&P believes that because of globalisation and liberalization of financial markets, the need for such benchmarks increased enormously.[[3]](#footnote-3) The CRAs provide an independent benchmark and help reduce the information asymmetry between issuers and investors.

# 2.1 Predictability of rating events

Ratings are considered to have a large impact on financial markets and over the past decades there has already been quite some extensive research done on various aspects of CRAs and their ratings. Several studies focus on the possibility of predicting ratings and rating changes. Kaplan and Urwitz (1979) build an empirical model using as much as six explanatory variables and were able to correctly estimate more than two-third of newly issued company ratings. Following that paper, Cantor and Packer (1996) show that by using a model with only eight variables[[4]](#footnote-4), 90% of an assigned rating can be explained, leading to over 70% of accurately estimated ratings. Later research by Amato and Furfine (2003) and Hill et al. (2010) support this result and the indicators they use are publically available and it is therefore expected that most of the effect on market’s reaction associated to a rating event is already anticipated. However, there is still some significant reaction in the markets suggesting that, according to Hand et al. (1992), the rating changes contain at least some additional information. This is in line with the methodology used by S&P (2012) who look at scores on five key areas to come to a benchmark rating and use their own assessment of the issuer to come to a final rating, thus containing a small bit of additional information as explained in the previous section. Deutsche Bank (2004) supports the idea of not only using a model but also use analytically derived opinions as it argues that if everyone uses the same model to predict the market, everyone would react to the same warning signals, which could lead to acceleration of a could-be crisis.

# 2.2 Rating events during crises

From 1997 to 2002, there were several crises which exposed the shortcomings of the CRAs. Radelet et al. (1998) looked at reasons for the East Asian crisis to erupt. They think it is partly due to collective actions by cautious investors no longer lending out money. Debtors therefore immediately went into default, which led to exchange rates being under pressure and foreign investors expecting a domino effect for other countries causing a self-fulfilling prophecy. When all this was already going on, the CRAs belatedly started downgrading the East Asian countries, which led to even more credit withdrawal from the region and thus a further deepening of the crisis. In the aftermath of the East Asian crisis there were two major points of criticism on CRAs. The first was that they failed to detect weaknesses in advance and the second that when the CRAs finally responded, they overreacted with their downgrades, causing a further deepening of the crisis. Looking at the first point of criticism, Bhatia (2002) finds that the CRAs base their rating decisions on debt sustainability simulations rather than macroeconomic projection, pointing out that it is not the goal of CRAs to predict credit crises but to look at the probability of default and the expected recovery rate. During the Asian crisis however the currency crisis led to a debt crisis, which is something the CRAs should be able to predict and at which they failed. Sy (2004) looks into whether currency crises and defaults are closely linked and should therefore be anticipated by CRAs. He finds that indeed CRAs do not predict currency crises and only adjust their ratings afterwards. However, this should not be taken as a weakness of CRAs since currency crises only have a 6% correlation with sovereign defaults and thus it is not in the CRAs’ scope to anticipate currency crises. He also shows that CRAs are better at predicting defaults than currency crises but then again also fail to predict almost certain defaults if not for the large bailouts by the international community. He further supports the result found by Reinhart (2002) who shows that only in 46% of the currency crises default occurs. For emerging economies this raises to 69% showing again that even though a currency crisis does not necessarily mean default, it does increase the likelihood of default. Reinhart therefore suggests that CRAs use additional variables to check for currency crises as well. Hill and Faff (2010) emphasize that timeliness is everything when it comes to rating events. If CRAs react too early, they are accused of accelerating and exacerbating crises. But when too late, they are criticized for failing to accurately predict the increased risk and possible default. The timeliness of the rating event is thus crucial as a wrong timing could cause a worsening of a crisis.

Bhatia (2002) also looks at the effects of overreaction by the CRAs caused by rating failure, i.e. the ability to accurately predict a country’s probable future, i.e. no more than a three-notch change within 12 months. His study shows that in times of crisis CRAs continually fail in their ratings, often because they appear to be too conservative in their assumptions. When CRAs finally do react, they tend to overreact. Several other studies support these findings stating that “ratings tend to be sticky, lagging markets, and then to overreact when they do change” (Larrain et al. (1997), Radelet et al. (1998), Amato and Furfine (2003) and UNCTAD (2008)).[[5]](#footnote-5) To their defense, the CRAs respond that it is their goal to maintain rating stability and not to react to short term changes (Moody’s, 2011; Amato and Furfine, 2003; Altman and Rijken, 2004; UNCTAD, 2008; Hill et al., 2010; Pennartz and Snoeij, 2012) Even though CRAs emphasize that their vision applies for the long term, they catered to the criticism by coming up with short term visions implemented in outlooks which are now assigned to every rating to have an indication of the expected trend. Under normal circumstances countries are reviewed once every 2 years. In times of economic turmoil, rating decisions have to be made *ad hoc* and are sometimes an *ex post* reaction to media coverage (Bhatia, 2002 and UNCTAD, 2008).

# 2.3 The influence of rating events on non-sovereign yields

A first work exploring the effect of rating changes on corporate yields is by Katz (1974). He finds that the rating change is not anticipated in the months prior to the change and that it takes between 6 to 10 weeks for prices to adjust, suggesting strong market sluggishness. Partnoy (1999) argues that CRAs only look at already available information and therefore their ratings are lagged. This underlines earlier research by Weinstein (1978) who looks at monthly stock returns and found no significant evidence for rating changes having any influence on those returns. Finding no significant statistical evidence leads Weinstein to believe that there is strong market efficiency. The first ones to do research on the effect of rating changes on daily bond- and stock prices were Hand et al. (1992). Using only a 20-day window, they find marginal significant evidence for downgrades. Later Cantor and Packer (1996) confirm this result by showing that even though most of a rating event is already anticipated; there are still significant returns after the rating change, suggesting it contains at least some new information. Seeing that most of a rating event is already anticipated, Hull et al. (2004) look at whether CDS spreads could predict rating events and found significant evidence that they could. From one day after the rating event there were no longer any significant returns, which is in line with Norden and Weber (2004) who find that all type of rating events are anticipated and show no significant results the days after a rating event. Micu et al. (2006) get roughly the same results of anticipating negative rating events, however, there are significant returns after positive rating events as well, but more on those asymmetric results later in this paper.

## 2.4 The influence of rating events on sovereign yields

Because sovereign rating is relatively new, the earliest studies on the influence of rating events on sovereign CDS spreads and bonds date from the 1990’s. Cantor and Packer (1996) find a strong correlation between rating events and sovereign spreads as well as information availability. Even though much of the rating event is anticipated, they show significant statistical evidence that rating events independently affect the sovereign spreads. Larrain et al. (1998) find the same results, muted by anticipation in the previous weeks, for negative rating events in emerging markets. Kaminsky and Schmukler (2002) also show that rating events significantly affect sovereign spreads and bond yields. This is in contrast with Bissoondoyal (2004) who finds no significant impact by rating events. However, later studies get significant results on rating events having an impact on the markets (UNCTAD (2008), Ismailescu and Kazemi (2010) and Afonso et al. (2012)). Additionally, Gande and Parsley (2010) also find significant effects of ratings on capital flows. After a downgrade, the event country experiences an increased outflow and decreased inflow of capital. Where most studies get significant effects in the aftermath of a rating event even though most of it is anticipated, Hull et al. (2010) show that sovereign CDS spreads serve as a perfect indicator for upcoming rating events. The total effect is anticipated and adjusted in the markets by the day the rating event is taking place.Because of the fact that so much of the rating event is already anticipated and hardly contains any new information, CRAs are criticized for acting pro-cyclical (Kaminsky and Schmuckler, 2002; Amato and Furfine, 2003 and UNCTAD, 2008). Larrain et al. (1998) and Reinhart (2002) however do not seek the reason in pro-cyclicality but in the reasoning that not only sovereign markets react to rating event but that rating event also systematically happen due to market conditions, suggesting it is a two-way correlation.

## 2.5 Information availability

The importance of information availability is already shown by Fama et al. (1969), who look at stock splits.[[6]](#footnote-6) Announcements for stock splits cause reactions to markets even though not all information is available. Only after full disclosure did the markets settle down. This behaviour underlines the importance of the availability of information to the market. When researching deviations in models Fama (1998) finds that they are most often present when small firms are included, suggesting that information availability (which is often lower for small firms) is of influence on stock returns. If information is not widely available, rating changes bring more of a ‘shock’ to investors and this results in abnormal negative returns after downgrades. That rating events differing in impact could be dependent on the size of the firm is confirmed by Dichev en Piotroski (2001) and Micu et al. (2006), who all find that underperformance after a downgrade is most pronounced for small firms with ratings of a speculative grade. Whether country size measured in GDP has effect when looking at sovereigns remains inconclusive as Cantor and Packer (2005) find no significant impact but Ferreira and Gama (2007) do.

The reasoning of a two-way correlation as well as the dependence on size seems logical when looking at media coverage. Cantor and Packer (1996) have already found high correlation between rating changes, market reaction and information availability. Norden (2008) predominantly focus on media coverage and show that the anticipation of downgrades can very well be explained by that variable. Firms with high media coverage experience a large effect 90 to 11 days prior to the rating event, whereas firms with low media coverage experience the highest effect 11 to 2 days prior to the event. This suggests that ratings or reviews for firms with low media coverage contain more additional information. He also gives empirical evidence on private information having influence as well. Firms that are being financed by a large number of banks seem to provide the CDS market with private information. This makes sense, as banks would have inside information on the firms they are financing. The CDS market, on which banks are active, has a stronger reaction prior to negative events than on the event day or in the days following the rating event. The impact of media coverage is best explained by Radelet et al. (1998) who looks into the effect of the announcement made by the US Treasury and the IMF that Indonesia was not implementing the IMF rescue program as agreed[[7]](#footnote-7). In reaction, interest rates and bond yields increased making it therefore impossible to honor agreements. The announcement was made too hasty, but as media coverage in these events is extremely high, the damage already done.

## 2.6 Transparency

When information availability is low it could be because of low transparency, which might be an indication that the relevant country experiences a high level of corruption. Drabek and Payne (2001) look at the different aspects of transparency and define low transparency as either bribe and corruption, lack of property rights protection, bureaucratic inefficiency, poor law enforcement or the likeliness of economic policy. The level of transparency is closely related to the level of publicly available information. If this level is low, any piece of information that becomes public will have larger impact on the markets compared to transparent countries. Since information is not always publically available in the case of corruption, markets are quite dependent on the opinion of CRAs. This is endorsed by Kaminsky and Schmukler (2010), who find that rating events only have significant impact in non-transparent countries. Gande and Parsley (2010) reason that for rating events to have an impact, they should contain new information. Since the level of information availability differs among countries, they imagined that the level of corruption could serve as an influential variable and indeed find that less corruption (i.e., more transparency) completely offsets any impact by rating events. Their study also shows that more corrupt countries (i.e., low transparency level) which experience a downgrade have significantly high capital outflows, mainly to non-events high-transparency countries, which they call the ‘flight to quality phenomenon’. The reasoning that a (as it turns out negative) rating event contains new information is supported by their research as low transparency countries have less public information. This result is consistent with Norden (2008) who states that the amount of media coverage helps explain the anticipation of downgrades. This is also in line with Drabek and Payne (2001) whose research gets significant and robust results on the positive influence of improved transparency on FDI inflows[[8]](#footnote-8). Their results as well as those of Kaminsky and Schmuckler (2010) apply to emerging economies. Earlier Goh and Ederington (1993) and Larrain et al. (1997) also find significant impact only for emerging markets.

## 2.7 Conformity between the various studies

Even though lots of different studies have been done about the influence that rating changes have on the financial markets, they are not always giving the same results. Weinstein (1978) and Bissoondoyal (2004) are the only two studies on the impact of rating events to find no significant effect at all. Katz (1974), Grier and Katz (1976), Cantor and Packer (1996) and Micu et al. (2006) find significant symmetric results for upgrades and downgrades. Their studies suggest that most of the effect is anticipated[[9]](#footnote-9) before the actual change, but in the aftermath there is still some measurable effect for companies as well as sovereigns. Their findings are in contrast to almost all other literature, in which most reach to the conclusion that if there is any reaction following a rating event, this reaction is only significant for downgrades. Companies show significantly strong reactions in the anticipation (Hull et al., 2004; Norden and Weber, 2004; Purda, 2007 and Norden, 2008) of downgrades as well as in the weeks that follow (Hand et al., 1992; Fama, 1998 and Dichev and Piotroski, 2001). When looking at sovereigns, the conclusion is roughly the same. Larrain et al. (1997), Hill and Faff (2010) find significant abnormal returns in the aftermath of a negative rating event, Afonso et al. (2012) find significant reactions in CDS spreads and bond returns and Gande & Parsley (2010) see significant downfall in capital flows following a downgrade. In their own evaluation of assessing rating changes, even S&P (2012) reaches to the conclusion that negative information usually comes as a surprise, so that a significant reaction is indeed to be expected. Positive news leading to an upgrade is easily anticipated and causes no significant reaction in the aftermath. Downgrades do show strong signs of anticipation but given the results of the already mentioned literature, negative news is apparently not already fully adjusted by the markets. All this is in contrast with Ismailescu and Kazemi (2010) who are the only ones to find results suggesting that negative events are fully anticipated by the markets, whereas upgrades cause significant reaction in the CDS spreads. There are also asymmetric results when looking at investment-grade and speculative bonds. Hand et al. (1992), Goh and Ederington (1993) and Larrain et al. (1997) only get significant results for the investment-grade bonds, which is the opposite of Cantor and Packer (1996). Dichev and Piotroski (2001) get more pronounced results for speculative grade.

## 2.8 Contagion

Another important effect of rating events is the spillover effect or contagion. Gande and Parsley (2005) reach to the conclusion that negative rating events have a significant explanatory effect on sovereign spreads in non-event countries. This is in line with later literature (Ismailescu and Kazemi, 2010; Afonso et al., 2012). Kaminsky and Schmukler (2002) and Ferreira and Gama (2007) find evidence for spillover effects being present in the region, countries with geographical similarities and emerging or ‘vulnerable’ economies. Based on research done by Norden and Weber (2004) further literature does confirm the importance of paying attention to previous rating events, because after controlling for that, the spillover effect of the current rating event is reduced. To research whether this contagion is affecting results is a completely different study, but it must be kept in mind that significant spillover effects have been found in earlier literature and some caution should be taken when interpreting results.

# *3. Hypotheses*

Based on the above literature I believe that the influence of information availability on the impact of rating events is a part that is not yet well-explored. To this end the main purpose of this study is to test whether the effect of credit rating events on sovereign bond yield speads depends on the levels of information availability in each country. Therefore, I test if, after controlling for non-transparency (corruption) and freedom of press, the effect of credit rating changes by the largest three CRAs on yield spreads of 1-, 5- and 10-year sovereign bonds is no longer significant for explaining yield movements. Based on this, my first hypothesis is as follows:

Hypothesis 1: After controlling for information availability, credit rating events have no significant impact on yield spreads, namely, the more transparent and free of censorship a country is, the more a rating event is anticipated and thus already incorporated by the markets.

Next, I test on which bonds’ maturity the credit rating events have the largest impact, provided that any effect is found. By looking at short (1-year), mid-to-long (5-year) and long (10-year) horizons, a distinction can be made between the bonds to see on which maturity credit rating events have the most impact. Following literature[[10]](#footnote-10) implying that the longer the bond-duration, the more volatile the bond price is to changing interest rates, I expect that the longer the maturity is, the more volatile the bond market is.

Hypothesis 2: Impact is larger for long maturity sovereign bonds (i.e. 10-year)

Following earlier research findings of asymmetric effects, discussed in the literature review, I expect that if any significant effect is found, negative credit rating events will cause more reaction than positive events.

Hypothesis 3: If significant effects are found, suggesting inefficient markets, the results will be asymmetric, only possibly significant for negative credit rating events.

Finally, I test if the impact differs for different events such as changes in ratings, outlooks and watchlist. Also if, depending on which of the three CRAs generated the event, different levels of impact occur. Judging from earlier studies I expect outlook changes and watchlist announcements to have a stronger effect than actual rating changes.

# *4. Methodology*

## 4.1 Data

The data I use are all on a monthly basis. The yield spreads and rating events were already in this time-span; the information variables are provided on yearly basis so I adapted them. Because of small differences between the years I felt comfortable setting them as monthly data by giving every month the same value as its yearly average. Ratings are given for a 3 to 5 year horizon and are also assigned an outlook (positive, negative, stable) that indicates the expected trend for the next 1 to 3 years. If placed on CreditWatch (S&P), Review (Moody’s) or Alert (Fitch), it means an almost certain change in the rating can be expected within a few months. The CRAs already make a distinction between positive and negative watchlist placements. If an announcement is made about a rating, whether it is an upgrade, downgrade, positive- or negative review or outlook change, it is called a rating event. CRAs use different methodologies when composing a rating. S&P only considers the probability of occurrence of default, Moody’s the expected loss: a combination of the probability of default and the expected recovery rate. Fitch looks at the probability of default until the moment of default; after that they look at the expected recovery rate. The ratings of these three CRAs are thus not completely equal, but overall quite similar.

For clear understanding of how ratings are composed I give a short overview of the process that is followed by S&P for compiling a sovereign rating. S&P just updated the criteria for rating sovereigns to obtain “an enhanced measure of a sovereign’s contingent liabilities related to the financial sector and articulate the special credit characteristics of sovereigns within a monetary union”.[[11]](#footnote-11) The criteria used by S&P for its rating calculations consist of five key factors: political, economic, external, fiscal and monetary. All these five receive forward-looking scores ranging from 1 (strongest) to 6 (weakest). The combination of these scores gives a political and economic profile for the reviewed country and at the same time a monetary flexibility and performance profile. Via these two profiles an indicative rating is determined. The resulting score for a certain country is compared to others in the same group and then the foreign-currency rating (which is the rating universally measured with) of that country is set within one notch of the benchmark rating of its peers. The sovereign local-currency rating is determined by adding a maximum of two notches. This can be due to certain domestic governmental systems, but when for example the country is part of a monetary union, foreign- and local-currency ratings will be the same. The analysts first look at publically available information in order to define what additional information the issuer should provide. Then there is a meeting with representatives of the issuing country as well as representatives from the central bank and the private sector in order to get as much information as possible. After that, the analysts present their conclusions to the committee, consisting of 5 to 7 members including the analysts, and a final rating is established, leading to that possible one-notch difference with the benchmark. This final rating is S&P’s assessment of the country’s overall ability to repay their obligations. Under normal circumstances countries are reviewed once every 2 years. In times of economic turmoil, rating decisions have to be made *ad hoc* and are sometimes an *ex post* reaction to media coverage (Bhatia, 2002; S&P, 2011). The exact methodology used by Moody’s and Fitch is not publicly available but comparable to that used by S&P.

In order to get a clear view of the effects of the three largest CRAs and different types of rating events, I construct 32 different dummies. Fitch, Moody’s and S&P are separately tested as well as the three combined. This makes a total of four. I also make a distinction between the up- and downgrades, positive and negative outlook changes and positive and negative watchlist announcements. Also all positive rating events will be combined as well as all the negative events. This makes a total of eight. So for each CRA as well as the 3 CRAs combined, eight different dummies are constructed. This dummy will take a value of 1 for the month that the rating event of the given CRA takes place; the other CRAs are set to 0. For the dummy where the CRAs are combined the dummy is set to 1 if a rating event - for any of the CRAs - takes place, otherwise it is set to 0. As mentioned earlier, any significant impact disappears after 30 days maximum. Because of this, the dummy is set back to 0 for the non-event months. As ratings are constructed from publicly available data, the expected size is very small. The expected sign could be either positive or negative. Most likely it will be positive for negative credit rating events as it is expected to increase the spread and negative for positive rating events decreasing the spread (See Table 4.1).

In contrast to Cantor and Packer (1996) and Gande and Parsley (2004) I only include two other explanatory variables in my model. Rating events ought to already include all, or at least most, macro-variables that are of influence on sovereign spreads, which is explained above in the methodology used by S&P to conduct ratings. The other variables I use are included to control for the information availability of a country. I do this not because I try to explain the dependent variable but because I want to test if the effect of rating events on the dependent variable changes after including these variables. According to Grossman and Stiglitz (1980) and Fama (1991), the EMH states that “security prices fully reflect all available information and a precondition is that information and trading costs, the cost of getting prices to reflect information, are always 0.” Thus, if information is freely accessable, the EMH should hold. If however information is not freely available, it no longer holds.

In my thesis I use two explanatory variables that cover the problem of information availability.[[12]](#footnote-12) The first is transparency, gathered from the Corruption Perceptions Index by Transparency International. Here they focus on resisting and reducing corruption by developing and promoting practical tools which can be used in the fight against that corruption. Assessing absolute levels of corruption is impossible because of lack of hard empirical data. The Index is therefore, as stated in the name, based on how corrupted a country’s private sector is perceived to be. It is a combination of several yearly surveys performed by different institutions. The scoring of the countries means that higher values indicate less perceived corruption in the public sector, whereas low-scoring countries are perceived to experience a lot of corruption. The second variable is the Freedom of Press Index, published by Reporters without Borders and based on a yearly questionnaire send to worldwide journalists, jurists, researchers and human-right watchers on the levels of censorship, independence of public media, press legislation, safety of reporters, transparency and the efforts made by the authorities to respect, allow and enhance freedom of press. It is not an index on the quality of journalism or the abidance of human rights in general. Based on the data collected from the survey, Reporters without Border construct a scoring card for the countries where high values indicate low scores on freedom of press. Together, these two variables should give an accurate input for the levels of information availability. The Transparency Index is expected to have a negative sign as higher values mean more transparency. The Freedom of Press Index is expected to have a positive sign as higher values mean less freedom of press. Both variables are expected to have a reasonable size (See Table 4.1.)

Lastly, I include a dummy for the recent financial crisis, starting in September 2008 with Lehman Brothers filing for bankruptcy. Before September 2008 the dummy is set to 0 for each month, after that, the dummy is equal to 1. This way there is insight in the effects of this crisis on the impact of rating events on sovereign spreads. The dummy for the crisis is expected to have a positive sign, because markets are expected to react with increased risk aversion in times of crises. As seen in earlier research by Radelet et al. (1998) and Bhatia (2002), crises tend to have quite some influence and I therefore expect a large impact (See Table 4.1).

TABLE 4.1

|  |  |  |
| --- | --- | --- |
| Variable | Expected sign | Expected size |
| Positive rating events | - | Small |
| Negative rating events | + | Small |
| Transparency Index | - | Medium |
| Freedom of Press Index | + | Medium |
| Crisis Dummy | + | Large |

##

## 4.2 Description of the data

In this study I use of a panel data set of 34 countries for monthly data between the years 2002 and 2012. The dependent variable is estimated for spreads of 1-, 5- and 10-year maturity sovereign bonds, using Germany as benchmark, on a set of explanatory variables. The sample of countries (see Appendix A) is largely heterogeneous since it contains a large variation in the geographical, political and economic dimensions. The number of observations per regression is near 4000. The amount of rating events differs among the CRAs. Fitch has 243 positive- and 247 negative rating events. Moody’s 125 positive and 66 negative and S&P 91 positive and 92 negative rating events. The transparency variable ranges with values between 0 and 10, where 0 means no transparency and 10 is complete transparency. The Freedom of Press variable has scores starting from 0, meaning complete freedom of press, going up to 124 for Vietnam, indicating low levels of freedom of press.

# *5. Empirical model*

To test the effect of information availability on spreads I use three different models. The first contains a constant and the rating event dummy. The second also includes the explanatory variables of transparency and freedom of press and the third model includes a dummy for the crisis as well. I choose to work with three different models to get a clear view of the impact of rating events and of what happens to that impact if I account for information availability. Furthermore I also test if a crisis is of influence on spreads.

Model 1

Yit = αi + β1D1ijkt + εit

Model 2

Yit = αi + β1Dijkt + β2X1t + β3X2t + εit

Model 3

Yit = αi + β1Dijkt + β2X1t + β3X2t + β4D2t + εit

Yit = Sovereign bond spreads

αi = Country-specific fixed effect

D1ijk  = Rating event Dummy

X1 = Transparency Index

X2 = Freedom of Press Index

D2 = Crisis Dummy

i = Country index

j = Credit rating agency index

k = Credit rating event index

t = Time index

When estimating the models I include cross-section fixed effects because of the use of countries, who all have there own unobserved differences. The fixed effects model explains to what extent the individual countries differ from the average. To account for heteroskedasticity and auto-correlation I include White period standard errors & covariance.

These models are used to show that the impact of rating events are no longer significant when controlling for information availability. The models are not constructed to better explain the dependent variable, which is the sovereign spread, but to look at differences in impact of rating events. Because of the Efficient Market Hypothesis (EMH)[[13]](#footnote-13) I expect these models to contain enough explanatory variables. As stated earlier in this research[[14]](#footnote-14), ratings are constructed of publicly available information on economically and politically important issues. Because this information is processed by CRAs it takes some time before the rating or the rating event takes place. That way, the rating event is lagged and should therefore contain no new information. The current bond markets should be able to have access to that same information needed to evaluate a country. Because of this, rating events should not have any impact on bond markets. As a result, accounting for transparency and freedom of press as the only possible obstacles for information availability should be enough to diminish the effect of rating events. The model thus does not need to perfectly explain spreads movements; it is constructed to diminish or rule out completely the impact of rating events following the EMH.

Also, because of the fact that ratings are constructed from macro-economic factors, the variable for rating events should contain enough imput to not have a problem with omitted variables. There is also the case of possible simultineity as rating events could affect yield spreads and yield spreads affect rating events. If the theory I have explained above about the EMH holds, the effect of ratings on yield spreads should disappears. Ratings and yield spreads are both dependent on the same macro-economic factors and if my theory is correct in that rating events are lagged it is to be expected that the ratings are therefore also depending on old yield spreads.

# *6. Results*

## 6.1 Description of the results

In this section a description of the results from the empirical models is given for all positive- and all negative rating events combined. More specified results on all different types of rating events can be found in Appendix B. The analysis of the results and the testing of the hypotheses are given section 6.2

When looking at the 1-year bond spreads (Table 6.1), results show that the coefficients for negative and positive rating events are insignificant in all models.

TABLE 6.1: Sovereign 1-year yield spreads

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Variable | CRA |  |  |  |
|  |  | Model 1 | Model 2 | Model 3 |
| Positive rating event | F | 3.902(0.982) | 4.215(1.011) | 0.077(0.409) |
|  | M | -0.555(-1.386) | 0.065(0.179) | 0.119(0.416) |
|  | SP | -0.296(-0.503) | -0.352(-0.487) | 0.118(0.209) |
|  | All | 1.197(0.855) | 1.565(0.983) | 0.061(0.235) |
| Negative rating event | F | 7.511(1.479) | 7.058(1.537) | 1.037\*\*\*(3.949) |
|  | M | 0.862\*\*\*(3.077) | 0.267(0.368) | 0.234(0.724) |
|  | SP | 4.005(1.571) | 3.178(1.699) | 0.474(1.369) |
|  | All | 3.923(1.495) | 3.434(1.595) | 0.476(1.413) |
| Transparency | All |  | 0.911(-0.889) | 0.042(0.332) |
| Press | All |  | 0.136(1.518) | 0.020(0.887) |
| Crisis | All |  |  | 1.295\*\*\*(2.702) |

Note: The numbers in brackets represent the t-statistics. Here totals are given for upgrades (downgrades), outlook changes and watchlist announcements combined for sovereign 1-year spreads. \*\*\*,\*\*,\* means significance at α = 1%, 5%, 10% respectively.

When looking solely at the effect of rating events, Moody’s shows significant effect for negative rating events. By controlling for Information availability this impact disappears, even though both variables are insignificant. If I then control for the crisis in the third model, Fitch shows significant results for negative rating events. The dummy crisis is also highly significant. All other variables and dummies do not significantly differ from 0.

When looking at the 5-year bond spreads (Table 6.2), which is the maturity CRAs give their ratings for, in Model 1 it shows that all negative rating events have significant positive results at a 1% level. Positive rating events have, with the exception of Fitch, no significant impact. By controlling for information availability in Model 2, the impact of rating events remains significantly positive, although the size decreases. After including the crisis dummy in Model 3 there is a further decline in the size of the impact, even though the negative rating coefficients remain significant.

TABLE 6.2: Sovereign 5-year yield spreads

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Variable | CRA |  |  |  |
|  |  | Model 1 | Model 2 | Model 3 |
| Positive rating event | F | -0.322\*(-2.155) | -0.242(-1.488) | -0.098(-0.656) |
|  | M | -0.296(-1.427) | 0.001(0.003) | 0.097(0.366) |
|  | SP | -0.026(-0.104) | -0.049(-0.179) | 0.041(0.147) |
|  | All | -0.187(-1.286) | -0.072(-0.390) | 0.039(0.196) |
| Negative rating event | F | 1.570\*\*\*(5.966) | 1.517\*\*\*(6.319) | 1.225\*\*\*(6.130) |
|  | M | 1.428\*\*\*(3.975) | 1.330\*\*\*(3.724) | 1.003\*\*\*(3.070) |
|  | SP | 1.500\*\*\*(3.980) | 1.249\*\*\*(3.447) | 0.964\*\*\*(3.146) |
|  | All | 1.289\*\*\*(3.759) | 1.196\*\*\*(3.715) | 0.916\*\*\*(3.418) |
| Transparency | All |  | -0.009(-0.068) | 0.013(.162) |
| Press | All |  | 0.055\*\*(2.131) | 0.039\*(1.671) |
| Crisis | All |  |  | 0.815\*\*\*(2.770) |

Note: The numbers in brackets represent the t-statistics. Here totals are given for upgrades (downgrades), outlook changes and watchlist announcements combined for sovereign 5-year spreads. \*\*\*,\*\*,\* means significance at α = 1%, 5%, 10% respectively.

The transparency variable is insignificant but the coefficient for freedom of press is significant at a 10% level. Again, the crisis dummy is highly significant at a 1% level. Positive rating events remain insignificant.

For the 10-year spreads (Table 6.3), results show an initial significance for negative rating events by Moody’s and S&P in Model 1. This effect disappears after controlling for information availability and by including a crisis dummy. In Model 3 only the dummy for the crisis is significant at a 1% level. All other variables and dummies become and/or remain insignificant.

TABLE 6.3: Sovereign 10-year yield spreads

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Variable | CRA |  |  |  |
|  |  | Model 1 | Model 2 | Model 3 |
| Positive rating event | F | -0.231(-0.518) | 0.014(0.032) | -0.178(-0.743) |
|  | M | -0.664(-1.821) | 0.153(0.324) | 0.250(0.546) |
|  | SP | -0.418(-0.577) | -0.519(-0.715) | -0.644(-1.001) |
|  | All | -0.445(-0.975) | -0.445(-0.355) | -0.215(-0.650) |
| Negative rating event | F | 1.542(1.326) | 1.090(0.878) | -0.121(-0.113) |
|  | M | 1.512\*\*\*(4.420) | 0.964(1.892) | 0.619(0.619) |
|  | SP | 1.584\*\*(2.304) | 0.654(0.677) | -0.090(-0.104) |
|  | All | 1.119(1.551) | 0.595(0.635) | -0.160(-.0183) |
| Transparency | All |  | -0.345(-1.012) | -0.141(-0.671) |
| Press | All |  | 0.166(1.355) | 0.120(0.956) |
| Crisis | All |  |  | 1.052\*\*(1.958) |

Note: The numbers in brackets represent the t-statistics. Here totals are given for upgrades (downgrades), outlook changes and watchlist announcements combined for sovereign 10-year spreads. \*\*\*,\*\*,\* means significance at α = 1%, 5%, 10% respectively.

##

## 6.2 Analysis of the results

Testing for hypothesis 1 shows that rating impact becomes insignificant for 1- and 10-year maturity spreads when accounting for information availability and the crisis. For the 5-year maturity spreads negative rating events still have significant impact although the size of the impact lessens by accounting for information availability and the crisis Thus, H1 partly holds.

Testing H2 shows that rating events only have significant impact for 5-year maturity spreads. 1-year and 10-year spreads show no significant impact of rating events. Impact does not become larger when maturity is longer; therefore, H2 is rejected. Given the fact that CRAs construct their ratings for the 5-year horizon and not for 1- and 10-year maturities, this result is not extremely surprising.

Testing for H3 shows that indeed, in accordance with almost all literature, results for positive and negative rating events are asymmetric. For positive rating events there are no significant results, regardless of the maturity. For negative rating events there are initially significant results for all maturities and after accounting for information availability and the crisis this significant impact, although smaller, remains for 5-year maturity spreads. H3 therefore holds.

For 1 year maturity yield spreads the R2, a measure for the fitness of the model, is near 0.18 for Model 1, around 0.20 for Model 2 and near 0.62 for Model 3. The low R2 for Model 1 shows that even though ratings include a large number of macro-economic variables, they are not very accurate for explaining yield spreads. The extra variables included in Model 2 are also of no importance for explaining the spreads, whereas the crisis dummy, which is also significant, indeed increases the accurateness of the model for explaining yield spreads. For this thesis however it is interesting to see that even though ratings are constructed from macro-economic data, they do not accurately explain the yield spreads, suggesting that they indeed contain outdated information, supporting the EHM. For 5 year maturity the R2 goes from 0.75 in Model 1 to 0.76 in Model 2 and finally 0.77 in Model 3. For this maturity ratings do seem to accurately explain yield spreads, suggesting the EMH does not (very well) hold. This is in accordance with the significance of the results, which shows that rating events are intended for the mid-to-long term. For the 10 year maturity yield spreads the R2 is 0.06 in Model 1, 0.07 in Model 2 and 0.07 in Model 3. For this maturity rating events seem to be of no influence at all for explaining yield spreads, suggesting that the EMH holds.

Looking into the detailed results it shows that Fitch has significant impact with watchlist announcement on every type of maturity (See Appendix B). This effect is more pronounced for negative announcements but also significant for most positive announcements. Why this is the case I do not know. Fitch does have the largest amount of rating events of all the CRAs. It is however quite surprising as most earlier studies have hardly ever found significant results for Fitch. Any effects of contagion because of the other two CRAs have not been taken into account but could be a factor in the explanation of this result.

Downgrades sometimes do have some significant impact whereas outlook changes and upgrades have hardly any influence. CRAs give their ratings for a mid- to long-term horizon (5-year) and from the results it becomes clear that negative rating events significantly influence sovereign 5-year maturity bond spreads even after controlling for information availability and the crisis. Overall, the detailed results are by and large the same as the combined results discussed above in section 6.1.

The variable for freedom of press is of significant influence on yield spreads. More important, even though it does not cause the effect of negative rating events to cease, it does decrease the influence. Norden (2008) already showed that the amount of media-coverage influences the impact of rating events and my models show the same results. The variable for transparency is not significant and therefore suggests that corruption and/or lack of transparency are not relevant for the bond markets to estimate and judge the economic climate of a country via yield spreads. It is, however, in accordance with Gande and Parsley (2010) who find that corruption does serve as an excellent measure for information availability. It is also in line with Drabek and Payne (2001) and Kaminsky and Schmukler (2010) who find evidence that rating events only have impact in non-transparent countries. Even though the variable for freedom of press is only a bit significant and the variable for transparency not significant at all for estimating yield spreads, the results do match with earlier studies who find a decrease in the impact of rating events on yield spreads when controlling for information availability. Including a highly significant dummy for the crisis also lessens the influence of rating events, which could be explained by the reasoning that markets react more heavily (see Table 6.4) in times of crisis. For 1- and 10-year maturity sovereign bonds the effect of rating events disappears completely when the variables for information availability are included.

TABLE 6.4

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Variable | Expected size | Actual size 1Y | Actual size 5Y | Actual size 10Y |
| Positive rating events | Small | Small | Small | Small |
| Negative rating events | Small | Medium | Large | Small |
| Transparency | Medium | Small | Small | Small |
| Freedom of Press | Medium | Small | Small | Small |
| Crisis | Large | Large | Medium | Large |

The fact that rating events still have significant influence on the markets shows that the Efficient Market Hypothesis (EMH) does not hold. Even though rating events are based on publicly available information and are therefore by definition lagged and contain no new information, they still cause reactions in the 5-year maturity sovereign bond markets. Obstacles in the likes of reduced information availability indeed lessened the effect but were not able to completely offset the rating event effect.

The sign of the significant variables are corresponding to the expected sign (See Table 6.5). Positive rating events and the transparency variable have conflicting signs but as both variables are insignificant it is not of great concern. Looking at the 1- and 10-year spreads it shows that no significant impact, positive or negative, is found after including the extra explanatory variables. For these bond markets the EMH seems to hold.

TABLE 6.5

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Variable | Expected sign | Actual sign 1Y | Actual sign 5Y | Actual sign 10Y |
| Positive rating events | - | + | + | - |
| Negative rating events | + | + | + | - |
| Transparency Index | - | + | + | - |
| Freedom of press | + | + | + | + |
| Crisis | + | + | + | + |

The only real oddity in the results is the reaction to watchlist announcements by Fitch (See Appendix B). That event seems to trigger significant reactions for all maturities. Their positive watchlist announcements are the only positive rating events to cause a significant reaction, however, with a positive sign. It seems that the markets do not assess this event as positive information. Apart from that it is clear that bond markets only possibly react to negative rating events and not to positive events. This asymmetry, which is in accordance to most previous studies, suggest that bull markets do not cause strong volatile reactions, whereas bear markets do get heavy reactions. This can be explained by the saying ‘take your losses and let your fortunes roll’, meaning there is less at stake by gaining than by losing.

# *7. Conclusion*

Earlier research on the impact of rating events on bond markets showed that despite of the fact that they do not contain any new information, rating events actually do significantly affect bond markets. This impact showed to be most pronounced for negative rating events. In this study I investigated on a sovereign level if by controlling for information availability and by filtering out a crisis effect, this impact would cease. By including the explanatory variables, which measure a country’s transparency level and the amount of press freedom, the effect of positive rating events completely cease and the impact of negative rating events decreases. After including a dummy for the crisis, which started in September 2008 and is still present, the effect was even more muted, though still significant. During crises the markets tend to have more volatile spreads. I also looked at different maturities and found that after including the extra explanatory variables the impact disappeared for 1- and 10-year maturity bond spreads. For 5-year maturity bond spreads the effect of negative rating events was still significant, although significantly muted. Given the fact that rating events are meant for this 5-year horizon it is not strange that if any effect would remain, it would be for this maturity. The only obvious oddity are watchlist changes by Fitch. They cause significant reactions to the markets, regardless of maturity and for both positive and negative events. Strangely though, the positive announcements have a positive influence on the spreads instead of negative.

# *8. Discussion*

Looking at the way CRAs compose their ratings, it becomes clear that it consists of publicly available information, mixed with analytically substantiated opinions. This shows that indeed rating events do not contain new information and that they are lagged when announcing a rating event. It is my opinion that therefore markets should not react to rating events. It is a good thing to be able to compare countries on an economic level and by giving the countries ratings it is easy for everyone to understand the differences in economic positions between the countries. However, markets nowadays are perfectly able to access the information needed to evaluate a country and are therefore (no longer) dependent on CRAs for information. The fact that there is significant impact, especially after negative rating events is in my opinion more panic than reason. Part of that can be explained by the degree of importance that international institutions and agreements give to ratings. According to certain agreements (for example BIS) banks should sell there bond if a country or company is rated at a speculative level. These rules are so strict that they could cause panic reactions to the market. However, in this research I did not look at the difference between investment grade and speculative grade, so maybe some explanation can be found there. It is also important to note that in this study the effect of contagion has not been taken into account. Whether or not this would affect the results calculated by this model could be the topic of a different study. Either way, it is my opinion and suggestion that when including rating as one of the criteria for buying or selling, it should not be strictly exercised since currently large investors are very well capable of processing information much earlier themselves. Rating should only be used as guidelines, not as a criterion.

# APPENDIX A

List of countries

|  |  |  |
| --- | --- | --- |
| Argentina | Greece | Saudi Arabia |
| Australia | Hungary | Singapore |
| Belgium | Indonesia | South Africa |
| Brazil | Ireland | South Korea |
| Canada | Italy | Spain |
| Chile | Japan | Sweden |
| China | Malaysia | Taiwan |
| Colombia | Netherlands | United States |
| Denmark | New Zealand | Venezuela |
| Finland | Nigeria | Vietnam |
| France | Portugal |  |
| Germany | Russia |  |

# APPENDIX B

Sovereign 1-year spreads: Positive rating events

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Variable | CRA | Coefficient | Coefficient | Coefficient |
|  |  | Model 1 | Model 2 | Model 3 |
| Upgrade | F | 7.816(1.023) | 8.030(1.046) | 0.379(1.602) |
|  | M | -0.567(-1.668) | -0.091(-0.379) | 0.036(0.184) |
|  | SP | -0.494(-0.750) | -0.296(-0.414) | 0.031(0.050) |
|  | All | 2.248(0.961) | 2.496(1.029) | 0.104(0.429) |
| Outlook | F | 9.224(1.076) | 9.612(1.093) | 0.134(0.316) |
|  | M | -0.773(-1.076) | -0.239(-0.359) | 0.009(0.017) |
|  | SP | 1.702\*(2.178) | 0.065(0.054) | 0.453(0.581) |
|  | All | 4.246(1.097) | 4.424(1.122) | 0.142(0.387) |
| Watchlist | F | -0.337\*\*\*(-7.44E+13) | -0.810(-1.028) | 0.296(1.318) |
|  | M | -0.346(-1.692) | 0.527(0.848) | 0.117(0.451) |
|  | SP | 0.958\*\*\*(17.959) | 0.238(0.494) | 0.192(1.030) |
|  | All | -0.248(-1.329) | 0.379(0.840) | 1.311(0.663) |

Note: For sovereign 1-year spreads. \*\*\*,\*\*,\* means significance at α = 1%, 5%, 10% respectively.

Sovereign 1-year spreads: Negative rating events

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Variable | CRA | Coefficient | Coefficient | Coefficient |
|  |  | Model 1 | Model 2 | Model 3 |
| Downgrade | F | 15.312(1.541) | 14.459(1.590) | 1.847\*\*\*(3.151) |
|  | M | 2.236\*\*\*(8.659) | 1.454(1.547) | 1.473\*\*\*(4.373) |
|  | SP | 5.562(1.452) | 4.781(1.550) | 0.390(1.164) |
|  | All | 7.197(1.493) | 6.525(1.573) | 0.988\*\*(2.310) |
| Outlook | F | -0.071(-0.063) | -0.430(-0.312) | 0.577(1.397) |
|  | M | -0.573(-0.589) | -0.506(-0.474) | -0.189(-0.256) |
|  | SP | 0.780(0.889) | -0.148(-0.111) | 0.796(1.662) |
|  | All | 0.137(0.153) | -0.302(-0.251) | 0.525(1.361) |
| Watchlist | F | 2.665\*\*\*(8.376) | 1.999\*(2.168) | 2.218\*\*\*(5.670) |
|  | M | 0.447(1.334) | -0.291(-0.570) | -0.526\*\*(-2.271) |
|  | SP | -0.103(-0.411) | -0.103(-1.350) | 0.020\*\*\*(-3.247) |
|  | All | 0.663(1.812) | -0.013(-0.016) | 0.128(0.421) |

Note: For sovereign 1-year spreads. \*\*\*,\*\*,\* means significance at α = 1%, 5%, 10% respectively.

TABLE 6.8 – Sovereign 5-year spreads: Positive rating events

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Variable | CRA | Coefficient | Coefficient | Coefficient |
|  |  | Model 1 | Model 2 | Model 3 |
| Upgrade | F | -0.338(-1.823) | -0.242(-1.092) | -0.026(-0.114) |
|  | M | -0.423(-1.928) | -0.197(-0.713) | -0.106(-0.382) |
|  | SP | -0.028(-0.146) | 0.063(0.294) | 0.240(1.115) |
|  | All | -0.182(-1.180) | -0.123(-0.634) | 0.005(0.023) |
| Outlook | F | -0.169(-0.855) | -0.066(-0.332) | -0.035(-0.212) |
|  | M | -0.463(-1.542) | -0.130(-0.402) | -0.076(-0.218) |
|  | SP | 0.904(1.319) | 0.299(0.435) | 0.092(0.147) |
|  | All | -0.035(-0.177) | -0.026(-0.111) | -0.028(-0.129) |
| Watchlist | F | 0.301\*\*\*(4.99E+13) | 0.432\*\*\*(3.682) | 0.746\*\*\*(4.560) |
|  | M | 0.005(0.019) | 0.364(1.415) | 0.477(1.714) |
|  | SP | -2.689(-1.103) | -2.946(-1.233) | -3.122(-1.402) |
|  | All | -0.209(-0.566) | 0.103(0.302) | 0.209(0.584) |

Note: For sovereign 5-year spreads. \*\*\*,\*\*,\* means significance at α = 1%, 5%, 10% respectively.

TABLE 6.9 – Sovereign 5-year spreads: Negative rating events

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Variable | CRA | Coefficient | Coefficient | Coefficient |
|  |  | Model 1 | Model 2 | Model 3 |
| Downgrade | F | 2.219\*\*\*(5.588) | 2.111\*\*\*(6.275) | 1.739\*\*\*(5.257) |
|  | M | 2.851\*\*\*(5.677) | 2.711\*\*\*(5.598) | 2.307\*\*\*(4.953) |
|  | SP | 1.677\*\*\*(5.811) | 1.496\*\*\*(5.386) | 1.207\*\*\*(4.755) |
|  | All | 1.939\*\*\*(5.920) | 1.830\*\*\*(5.982) | 1.494\*\*\*(5.470) |
| Outlook | F | 1.268\*\*\*(4.807) | 1.159\*\*\*(4.564) | 0.902\*\*\*(3.849) |
|  | M | 0.673(1.114) | 0.759(1.183) | 0.553(0.840) |
|  | SP | 0.030(0.045) | 1.580\*\*\*(3.210) | 1.332\*\*\*(3.007) |
|  | All | 1.327\*\*\*(4.379) | 1.221\*\*\*(4.258) | 0.990\*\*\*(3.910) |
| Watchlist | F | 3.251\*\*\*(5.852) | 3.139\*\*\*(5.799) | 2.797\*\*\*(5.902) |
|  | M | 0.745\*\*(2.155) | 0.552(1.753) | 0.209(0.762) |
|  | SP | 0.007(0.044) | -0.483(-1.573) | -0.840\*\*(-2.593) |
|  | All | 1.174\*\*\*(2.870) | 0.960\*(2.221) | 0.611(1.601) |

Note: For sovereign 5-year spreads. \*\*\*,\*\*,\* means significance at α = 1%, 5%, 10% respectively.

TABLE 6.10 – Sovereign 10-year spreads: Positive rating events

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Variable | CRA | Coefficient | Coefficient | Coefficient |
|  |  | Model 1 | Model 2 | Model 3 |
| Upgrade | F | -0.047(-0.052) | 0.152(0.191) | -0.314(-0.781) |
|  | M | -0.314\*(-2.164) | 0.342(0.656) | 0.443(0.843) |
|  | SP | -0.604(-0.672) | -0.386(-0.490) | -0.549(-0.900) |
|  | All | -0.232(-0.420) | -0.103(-0.202) | -0.288(-0.776) |
| Outlook | F | 0.591(0.763) | 0.877(1.048) | 0.061(0.227) |
|  | M | -0.931(-1.495) | -0.058(-0.064) | 0.032(0.035) |
|  | SP | 0.932(1.405) | -0.996(-0.646) | -1.399(-0.921) |
|  | All | 0.187(0.381) | 0.211(0.415) | -0.207(-0.567) |
| Watchlist | F | 0.454\*\*\*(2.67E+14) | 0.540(1.474) | 1.030\*\*\*(3.031) |
|  | M | -0.681(-0.757) | 0.388(1.177) | 0.385(1.293) |
|  | SP | 0.254(1.075) | -0.672(-0.949) | -0.946(-1.288) |
|  | All | -0.496(-0.668) | 0.318(1.071) | 0.332(1.172) |

Note: For sovereign 10-year spreads. \*\*\*,\*\*,\* means significance at α = 1%, 5%, 10% respectively.

TABLE 6.11 – Sovereign 10-year spreads: Negative rating events

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Variable | CRA | Coefficient | Coefficient | Coefficient |
|  |  | Model 1 | Model 2 | Model 3 |
| Downgrade | F | 3.608\*(2.142) | 2.713(1.768) | 0.616(0.698) |
|  | M | 2.641\*\*\*(7.987) | 1.821\*\*(2.391) | 1.609\*\*\*(2.936) |
|  | SP | 1.822(1.942) | 0.983(0.908) | 0.010(0.012) |
|  | All | 2.184\*(2.207) | 1.471(1.360) | 0.325(0.371) |
| Outlook | F | -0.123(-0.137) | -0.480(-0.404) | -0.556(-0.434) |
|  | M | 0.137(0.232) | 0.403(0.576) | 0.297(0.413) |
|  | SP | 0.735(1.083) | -0.276(-0.206) | -0.439(-0.298) |
|  | All | 0.118(0.168) | -0.306(-0.293) | -0.426(-0.382) |
| Watchlist | F | 2.623\*\*\*(7.506) | 2.016\*\*\*(2.815) | 1.810\*\*\*(3.396) |
|  | M | 1.245\*\*\*(3.168) | 0.494(0.856) | -0.066(-0.128) |
|  | SP | 0.066(0.817) | -1.378(-1.251) | -1.613(-1.484) |
|  | All | 1.104\*\*\*(3.614) | 0.387(0.562) | 0.049(0.074) |

Note: For sovereign 10-year spreads. \*\*\*,\*\*,\* means significance at α = 1%, 5%, 10% respectively.

# References

Afonso, A., Furceri, D., Gomes, P. (2012) “Sovereign credit ratings and financial market linkages: application to European data” *Journal of International Money and Finance*, 31 (3), 606-638.

Altman, E. I., Rijken, H.A. (2004) “How rating agencies achieve rating stability” *Journal of Banking & Finance*, 28, 2679-2714

Amato, J.D., Furfine, C.H. (2003) “Are credit ratings procyclical?” BIS Working Papers, No. 129

Bhatia, A.V. (2002) “Sovereign credit rating methodology: An evaluation” IMF Working Paper, Treasurer’s Department, WP/02/170

Bissoondoyal-Bheenick, E. (2004) “Rating timing differences between the two leading agencies: Standard and Poor’s and Moody’s” *Emerging Markets Review*, 5, 361-378

Cantor, R., Packer, F. (1996) “Determinants and impact of sovereign credit ratings” *Economic Policy Review*, 2 (2, October) 37-53

Deutsche Bank (2004) “Credit derivatives: Effects on the stability of financial markets” Deutsche Bank Research, June 2004

Dichev, I.D., Piotroski, J.D. (2001) “The long-run stock returns following bond rating changes” *Journal of Finance*, 56 (1), 173-203

Drabek, Z., Payne, W. (2001) “The impact of transparency of foreign direct investment” WTO, Economic Research and Analysis Division, Staff Working Paper ERAD 99-02

Fama, E.F., Fisher, L., Jensen, M.C., Roll, R. (1969) “The adjustment of stockprices to new information” *International Economic Review*, 10 (1), 1-21

Fama, E.F. (1991) “Efficient capital markets: II” *Journal of Finance,* 46 (5), 1575-1617

Fama, E.F. (1998) “Market efficiency, long-term returns, and behavioural finance” *Journal of Financial Economics*, 49, 283-306

Ferreira, M.A., Gama, P.M. (2007) “Does sovereign debt ratings news spill over to international stock markets?” *Journal of Banking & Finance*, 31, 3162-3182

Fitch Ratings: [www.fitchratings.com](http://www.fitchratings.com)

Gande, A., Parsley, D.C. (2005) “News spillovers in the sovereign debt market” *Journal of Financial Economics*, 75, 691-734

Gande, A., Parsley, D.C. (2010) “Sovereign credit ratings, transparency and international portfolio flows” MPRA Paper, University of Munich, Germany

Goh, J.C., Ederington, L.H. (1993) “Is a bond rating downgrade bad news, good news, or no news for stockholders?” *Journal of Finance*, 48, 2001-2008

Grossman, S.J., Stiglitz, J.E. (1980) “On the possibility of Informationally Efficient Markets” *The American Economic Review,* 70 (3), 393-408

Hand, J.R.M., Holthausen, R.W., Leftwich, R.W. (1992) “The effect of bond rating agency announcements on bond and stock prices” *Journal of Finance*, 47 (2), 733-752

Hill, P., Brooks, R., Faff, R. (2010) “Variations in sovereign credit quality assessments across rating agencies” *Journal of Banking & Finance*, 34, 1327-1343

Hill, P., Faff, R. (2010) “The market impact of relative agency activity in the sovereign ratings market” *Journal of Business Finance & Accounting*, 37 (9) & (10), 1309-1347

Hull, J., Predescu, M., White, A. (2004) “The relationship between credit default swap spreads, bond yields, and credit rating announcements” *Journal of Banking & Finance*, 28, 2789-2811

Ismailescu, I., Kazemi, H. (2010) “The reaction of emerging market credit default swap spreads to sovereign credit rating changes” *Journal of Banking & Finance*, 34 (12), 2861-2873.

Kaminsky, G., Schmukler, S.L. (2002) “Emerging markets instability: Do sovereign rating agencies affect country risk and stock returns?” *World Bank Economic Review*, 16 (2), 171-195

Kaplan, R.S., Urwitz, G. (1979) “Statistical models of bond ratings: A methodological inquiry” *Journal of Business*, 52 (2), 231-261

Katz, S. (1974) “The price adjustment process of bonds to rating reclassifications: A test of bond market efficiency” *Journal of Finance*, 29 (2), 551-559

Larrain, G., Reisen, H., von Maltzan, J. (1997) “Emerging market risk and sovereign credit ratings” OECD Development Centre, Working Paper No. 124

Micu, M., Remolona, E., Woolridge, P. (2006) “The impact of rating announcements: which announcements matter?” BIS Working Papers, No. 207

Moody’s ratings: [www.moodys.com](http://www.moodys.com)

Moody’s (2011) “New methods for modelling sovereign risk in credit portfolios” Moody’s Analytics May 2011

Norden, L. (2008) “Credit derivatives, corporate news, and credit ratings” Working paper, University of Mannheim, Germany

Norden, L., Weber, M. (2004) “Informational efficiency of credit default swap and stock markets: the impact of credit rating announcements” *Journal of Banking & Finance,* 28, 2813-2843.

Partnoy, F. (1999) “The siskel and ebert of financial markets?: Two thumbs down for the credit rating agencies.” *Washington University Law Quarterly*, 77 (3), 619-712.

Pennartz, J., Snoeij, J.P. (2012) “Sovereign credit ratings: An assessment of sovereign rating provided by Moody’s, S&P and Fitch” Rabobank Working Paper Series No.12/2

Purda, L.D. (2007) “Stock market reaction to anticipated versus surprise rating changes” *The Journal of Financial Research*, 30 (2), 301-320

Radelet, S., Sachs, J., Cooper, R., Bosworth, B. (1998) “The East Asian financial crisis: diagnosis, remedies, prospects” *Brookings Papers on Economic Activity*, 28 (1), 1-90

Reinhart, C.M. (2002) “Default, currency crises, and sovereign credit ratings” *World Bank Economic Review*, 16 (2), 151-170

Reporters without Borders: <http://en.rsf.org/>

Standard & Poor’s ratings: Bloomberg market data

Standard & Poor’s, (2012) “Sovereign defaults and rating transition data, 2011 update” Global Credit Portal, RatingsDirect, March 2, 2012

Standard & Poor’s, (2012) “How we rate sovereigns” Global Credit Portal, RatingsDirect, March 13, 2012

Sy, A.N.R. (2004) “Rating the rating agencies: Anticipating currency crises or debt crises?” *Journal of Banking & Finance*, 28, 2845-2867

Transparency Organization: <http://www.transparency.org/>

UNDTAD (2008), Elkhoury, M. “Credit rating agencies and their potential impact on developing countries” UNCTAD Discussion Paper, No. 186

Weinstein, M.I. (1978) “The effect of a rating change announcement on bond price” *Journal of Financial Economics*, 5, 329-350

1. See the literature review in the next section: it is very well possible to predict rating events based on publicly available information. Also see: Standard & Poor’s “How we rate sovereigns”, 2012. They acknowledge that their ratings are constructed based on publicly available data. [↑](#footnote-ref-1)
2. Bhatia (2002), p.47: A rating given by one of the three major CRAs means credibility with a broad range of market participants. It serves as a benchmark for domestic firms, widens the pool of investors and if not rated with speculative grade, it drives down the cost of borrowing. [↑](#footnote-ref-2)
3. Standard & Poor’s “How we rate sovereigns”, 2012 [↑](#footnote-ref-3)
4. Per capita income, inflation, external debt, economic development and default history are significant at a 1% level, GDP growth at a 10 % level and fiscal balance and external balance probe insignificant. But all-in-all, this model has an adjusted R-squared of 0.924. [↑](#footnote-ref-4)
5. The UNCTAD (2008) research was done after the downfall of Enron, Parmalat and WorldCom and the untimely late reactions by the CRAs are seen as one of the most likely reasons for markets not to have anticipated it. [↑](#footnote-ref-5)
6. New shares are issued causing the number of shares of a public company to increase. Following that, prices have to adjust to find a new equilibrium [↑](#footnote-ref-6)
7. The Indonesian government announced a 32% budget increase for the next fiscal year, leading US Treasury and IMF to believe that agreements were not being met. Later it became clear that this increased budget was due to the implementation of those agreements. [↑](#footnote-ref-7)
8. A one-point increase in the transparency index would lead up to 40% of increase in FDI inflows. Rankings are taken from the International Country Risk Guide by Political Risk Services, (PRS). The higher the rank, the more transparent that country is. [↑](#footnote-ref-8)
9. In Micu et al. (2006) results show that in the two months prior to a ring event, 70% of the cumulative abnormal CDS returns is already incorporated in the price. If the rating event is preceded by another rating event by either the same agency or another, 76% is anticipated. [↑](#footnote-ref-9)
10. Relationship between bond prices, interest rates and bond performance. Ambassador-capital/tutorial: <http://www.ambassador-capital.com/Tutorial_BondPriceRateRelationship.pdf> [↑](#footnote-ref-10)
11. Standard & Poor’s “How we rate sovereigns”, 2012 [↑](#footnote-ref-11)
12. Fama, E.F. (1991) “Efficient capital markets: II” Journal of Finance, 46 (5), 1575-1617 [↑](#footnote-ref-12)
13. EMH: Any piece of information will be directly – without delay - incorporated in the markets. Therefore, only new information should influence markets. [↑](#footnote-ref-13)
14. See section 4.1 on methodology, based on Standard & Poor’s “How we rate sovereigns”, 2012 [↑](#footnote-ref-14)