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Credit Rating Agencies: Do They Affect Financial Markets?

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Abstract

Do credit rating agencies affect financial markets? Did they play role to deteriorate the situation of the European Monetary Union after the financial crisis in 2009? These are some questions that occupied many people after 2009. Credit rating agencies have severely downgraded many EU economies and banks since the onset of the Greek debt crisis in 2009. For many commentators and policy makers rating agencies have amplified and precipitated the debt crisis in the EMU, creating "self fulfilling prophesies" and impeding the orderly resolution of the crisis through policy initiatives. But is this true? Is these correct opinions?

In this thesis we examine the above queries. We take a closer view whether rating agencies truly "play" a significant role in the conservation and in the aggravation of the crisis. Firstly, we describe and analyze the case where jointly issuers and rating agencies influence the markets. Mathis et al. (2009), Morgan (2000), Skreta and Veldkamp (2009) and Pagratis (2012), show that there is a connection between rating agencies and financial markets. Specifically, we observe that in case of solicited ratings there are indications of not objective ratings that may mislead financial markets. In the cases of sovereign rating we compare Ferri, Liu and Stiglitz (1999) and Mora (2005) about East Asian crisis. We observe that in this case, rating agencies not only do not affect the financial markets, but also their evaluations follow the market reactions. In other words, agencies' unsolicited ratings do not "play" role in markets decisions.

1.Introduction

Nowadays, more and more talk about whether the rating agencies have shared responsibility for the economic crisis afflicting most of Europe. We heard many senior officials of the European Commission and of many countries governments to claim (and blame agencies) that credit rating agencies with their attitude adversely affect the financial markets about the economic situation of their counties. We will take a closer view in these opinions, i.e. whether or not rating agencies affect the financial markets.

In the beginning, we explain what credit rating agencies are, we mention who do they rate, we discuss the methodology they are following to offer their services and in general we analyze the way that credit rating agencies operating. Furthermore, there is a definition about the different symbols the three most known rating agencies use and we conclude with the opinion that credit rating agencies consider themselves as "journalists" and they protect under the first Amendment of the U.S. Constitution Provisions.

Reputation is the key to the success of a rating agency and therefore, defines its implicit objective function. (Negative) reputation can be summarized by some weighted sum of type 1 error and type 2 error in testing the null hypothesis H_0: Credit x is "bad". This is based on Morgan (2000), who shows that the conservative rater worries more about overrating and errs further on the safe side in the more opaque sectors. Also, Mathis et al (2009), show that reputation considerations are not always sufficient to discipline a monopolist rating agency not to inflate the ratings of complex securities. Skreta and Veldkamp (2009), show that in an issuer-initiated market for ratings, ratings shopping may lead to bias in disclosed ratings of complex securities, even if the rating produced by each individual rating agency is an unbiased forecast. In contrast, simple assets tend to receive similar ratings by agencies, which eliminates the possibility for ratings shopping and bias in disclosed ratings disappears.

Moreover, we discuss the European Central Bank collateral rules. ECB was accepting as collateral in repo operations paper with not below "BBB-" by Standard and Poor's and Fitch or "Baa3" by Moody's. That restriction was relaxed in May 2010 and now the ECB accepts any paper issued or guaranteed by a European Member Union (EMU) member state, regardless of rating. Yet, the ECB would still not accept paper rated Selective Default (SD). SD may occur even in cases of "voluntary" debt exchanges if it appears that without such an exchange the only alternative for the sovereign would be to default.

For years, hardwiring of regulatory and investment decisions on ratings has proved to be convenient and a "cheap" solution to difficult monitoring problems. In times of crisis, it has possibly amplified market turbulence by causing forced sales of securities (e.g. Greek Government Bonds), which has led to a rapid increase in credit conditions (credit spreads), that feed into market sentiment weighing heavily on the economic environment. Pagratis (2012), show that in high levels of ratings hardwiring price informativeness falls more quickly and price volatility increases.

In the last chapter, we compare two different opinions about the procyclicality of sovereign ratings. On the one hand, Ferri, Liu and Stiglitz (1999), claim that the procyclical nature of rating agencies sovereign ratings may have contributed to aggravate the Easy Asian financial crisis. On the other hand, Mora(2005), show that in the case when country fixed effects are not included, ratings are found to be sticky rather than procyclical, although she provided support for the FLS (Ferri, Liu, Stiglitz) findings that predicted ratings were lower than assigned ratings during the period prior to the crisis.

The remainder of this thesis is organized as follows. Section 2 describes the basic objective function of credit rating agencies and what rating agencies do. Section 3 examines some cases where rating agencies are definitely responsible in financial markets decisions. Section 4 describes ratings hardwiring and provide also evidence that rating agencies affect with their reports the markets. Section 5 compares the

models results of FLS and Mora's (2005) about the sovereign ratings and whether rating agencies are procyclical or sticky. Section 6 concludes.

2. What Rating Agencies Do (Institutional CONTEXT)?

2.1 What Are Credit Ratings?

First of all, we should identify what are Credit Ratings. A Credit Rating is an opinion regarding the creditworthiness of an entity, a debt or financial obligation, debt security, preferred share or other financial instrument, issued using an established and defined ranking system of rating categories.

Credit Ratings are based on information obtained by Rating Agencies from sources believed to be accurate and reliable, including but not limited to Issuers and their agents, as well as sources independent of the Issuer. Rating Agencies relies on Issuers and their agents to provide information that is true, accurate, timely, complete and not misleading.

Also, they adopt all necessary measures so that the information they use in assigning a Credit Rating is of sufficient quality and from sources they consider to be reliable including, when appropriate, independent third-party sources. However, Rating Agencies are not auditors and cannot in every instance independently verify or validate information received in the rating process. Thus, in assigning a Credit Rating, they are in no way providing a guarantee with regard to the accuracy, timeliness, or completeness of factual information reflected, or contained, in the Credit Rating or any related Rating Agency publication.

In the rating process, Rating Agencies maintain independence in its relationships with Issuers, investors, and other interested entities, they do not have a fiduciary relationship with the Issuer whose security is being rated (or any other party) and nor they do act as an advisor to the issuer it rates. Moreover, rating agencies may comment on the potential credit implications of proposed structural elements of a security, but they do not participate in the actual structuring of any security under consideration for a Credit Rating.

As a matter of policy, and in keeping with its role as an independent and objective publisher of opinions, Credit Rating Agencies retain complete editorial control over the content of its Credit Ratings, credit opinions, commentary, and all related publications. Agencies receive the right at any time to suspend, modify, lower, raise or withdraw a Credit Rating, or place a rating on the watchlist in accordance with their policies and procedures. Finally, editorial control of Rating Agencies includes its right to decide whether, and when, to use a Credit Rating or publish any information or commentary, except in those rates instances where the public disclosure of a Credit Rating has been contractually limited or limited by applicable laws.

2.2 Who Do Credit Rating Agencies Rate?

Rating agencies rate issuers of debt, including sovereigns, corporates and Asset Backed Securities (ABS). Their ratings are either solicited (i.e. issuer-initiated, following demand from debt issuers, in which case the borrower is paying a fee to the rating agency) or unsolicited (rating agencies rate at their own initiative and without prior request by the debtor country). In the second case they rate purely for reputation purposes – they are the "good guys" to serve the best interests of creditors around the world – and they do not get any fee. Apparently they benefit from "cross-selling" capabilities and they "cash-out" reputation at later stage when it comes to offer a solicited rating to borrowers.

The most famous to the public credit rating agencies are Moody's, Standard & Poor's and Fitch. Although most people believe that the ratings are the same, it is not. The same rating from different agencies only looks the same. Nowadays there are dozens of rating agencies to choose from in various markets around the world and most of them publish their long-term risk opinions using different alphametric symbols.

But ratings are opinions about risks, not formulas. Accurate, forward-looking credit analysis cannot be mechanized. As an investor, you cannot

assume that a given letter rating from different agencies indicates the same degree of credit risk. As a borrower, you cannot assume that a rating from any agency will provide the same degree of access to the sources of investor capital.

2.3 Credit Rating Agencies Methodology (Corporate ratings)

Agencies may differ in ratings, but their operation is similar. Their credit analysis focuses on the fundamental factor and key business drivers relevant to an issuer's long-term and short-term risk profile. The foundation of their methodology rests on two basic questions:

i. What is the risk to the debtholder of not receiving timely payment of principal and interest on this specific debt security?
ii. How does the level of risk compare with that of all other debt securities?

Rating Agencies measure the ability of an issuer to generate cash in the future. Determining the predictability of future cash generation is therefore the primary focus of their analysis. This determination is built on a careful analysis of the individual issuer and of its strength and weaknesses compared to those of its peers worldwide. An examination of factors external to the issuer is also conducted, including industry-or country-level trends that could impact the entity's ability to meet its debt obligations. Of particular concern is the ability management to sustain cash generation to the face of adverse changes in the business environment.

In the course of the rating process, a Rating Agency analyst:

- Gathers information sufficient to evaluate risk to investors who might own or buy a given security,
- Develops a conclusion in committee on the appropriate rating,
- Monitors the security on an ongoing basis to determine whether the rating should be unchanged, and

- Informs the marketplace of Rating Agency actions.

The rating process involves an active, ongoing dialog between the issuer and the analysts. Once published, the ratings are continuously monitored and updated through dialogues and regular meetings, during which issuers are encouraged to raise any concerns and present all materials which are pertinent to the analysis.

If an issuer is new to the Rating Agency, the rating process begins with an introductory meeting or teleconference call. The purpose of this initial discussion is to introduce the rating process and methodology, and to provide additional information regarding the specific sorts of data that will be most useful in developing an understanding of the organization. Each Rating Agency seeks to be as transparent as possible, and to ensure that issuers understand their rating methodology and process.

A. Meeting with Management

For a first-time rating, the initial rating meeting is generally held at a company's head office location, and may last from a half day to a full day. Depending upon the nature of the entity being rated, site visits may also be involved. The agency analyst will discuss the meeting agenda with the issuer in advance of the meeting, to ensure the issuer is aware of the type of information he/she typical receives at such a meeting. The discussion at the rating meeting will generally focus on the following subjects:

- Background and history of the company/enter.
- Industry/sector trends.
- National political and regulatory environment.
- Management experience, quality, track record and attitude toward risk-taking.
- Management structure.
- Basic operating and competitive position.
- Corporate strategy and philosophy.

- Debt structure, including structural subordination and priority of claim.
- Financial position and sources of liquidity, including:
    i. cash flow stability, predictability and ability to service debt obligations,
    ii. operating margin, and
    iii. a balance sheet analysis in terms of debt profile and maturity.

Following the meeting, the analyst will continue with the analysis, and will generally conduct further discussions with the issuer in order to obtain follow up information and clarification. Upon completion of the analysis, the analyst will make a recommendation to the Agency's rating committee.

B. Agency's rating committee

A credit rating is forward-looking, and, by its very nature, subjective. The role of the Agency's rating committee is to introduce as much objectivity into the process as possible by bringing an understanding of the relevant risk factors and viewpoints to each and every analysis. For all sectors, the rating process is guided by a common set of basic analytical principles, including global consistency, an emphasis on qualitative factors and a focus on the long-term.

For a first-time rating, the lead analyst will convene a rating committee once all analysis has been completed. It is her responsibility to include as many credit risk professionals as necessary who have the appropriate knowledge and experience to address all of the analytical perspectives relevant to the issuer. Factors considered in determining the make-up of a rating committee may include the size of the issue, the complexity of the credit, and the introduction of a new instrument. Also taking into account are any issuers that will have ramifications in the market or any relevant sovereign issues. Rating Agency goal is to integrate the decision-making process on a global basis, to facilitate worldwide ratings consistency.

The role of the lead analyst at the rating committee meeting is to present the rating recommendation and rationale, and to ensure that all relevant issues related to the credit are presented and discussed. The discussions of Agency's rating committee are strictly confidential and only the analysts may serve on them.

C. Rating process timeline

Rating process, from the time of the preliminary discussion to the public release of the rating, takes approximately 60-90 days.

D. Rating dissemination and publication

Once the rating committee has made its decision, the issuer will be informed of the rating and Agency's rationale. For a public rating, the new rating is distributed by press release simultaneously to the major financial media worldwide. This press release will also appear on Rating Agency's global website.

E. External rating appeals

There may be instances in which the issuer has new or additional information that was not available to the Rating Agency for consideration by the rating committee in reaching its not-yet-published credit rating decision. In these circumstances, issuers may request that the Agency reconsider its decision based on this new or additional information, a process that is commonly referred to as "external appeal".

Issuers may not "appeal" a credit rating simply because they do not agree with rating outcome. Nor is the appeal process intended to enable a rated entity who is dissatisfied with the current credit rating decision to delay publication of the credit rating. The analysts work with the issuer throughout the rating process to obtain salient information for

consideration by the rating committee and consequently, the criteria for an external appeal are not expected to be met frequently. If an issuer communicates to Agency its desire for an “external appeal” before the credit rating is published, Agency-if not precluded by other circumstances-will delay publishing the credit rating while it assesses the relevance and significance of the new information that has been received from the issuer or its agent(s). If the Rating Agency believes that the new information may reasonably lead the rating committee to reconsider the rating conclusion, the rating committee will be reconvened as quickly as possible to consider the impact of the information on the credit rating.

As a general rule, the issuer should provide all documentation surrounding the new information promptly; that is to say, within several hours of the time the issuer informed Agency of the existence of the new information. The issuer may be given additional time to produce the necessary documents, if the reason for delay is determined to be valid and unavoidable.

F. Treatment of Confidential Information

An issuer’s trust in the confidential nature of the rating relationship is an essential component of the rating process. Confidential information will not be publicly disclosed, but, if relevant, will be used in the formulation of the public rating opinion.

G. On-Going Relationship

Following assignment and publication of the rating, Rating Agency will meet with management at least in annual basis, or more frequently as events and industry developments warrant. The analyst will maintain regular contract with the issuer both electronically and via the telephone, and will be available at all times to respond to an issuer’s needs or questions. Following publication of the press release announcing the initial assignment of the rating, the Agency will publish

quarterly summary opinions on the issuer. For certain very active issuers, an annual in-depth analysis will also be published. Press releases will be issued to announce any subsequent rating actions or outlook changes.

Rating Agencies analyzes all relevant risk factors and viewpoints in arriving at a rating opinion. Several analytical principles guide the process, including:

i. Focus on the long-term: analytical focus is on fundamental factors that will drive an issuer's long-term ability to meet debt payments, such as major economic downturns, a radical change in management strategy, or major regulatory developments. The ratings are not intended to ratchet up and down with business or supply-demand cycles or to reflect short-term market movements.
ii. Emphasis on stability and predictability of cash flow: one of the main analytical concentrations relies on understanding the drivers of cash flow generation and, in particular, the predictability and sustainability of cash flow. Rating Agencies will conduct financial analysis to determine an issuer's cash flow resilience in the event of an economic downturn. Specific risk factors likely to be weighed in a given rating will vary considerably by sector.

2.4 Rating Symbols

As mentioned above, gradations of creditworthiness of the better known Rating Agencies are indicated by different alphametric rating symbols, but with each symbol representing a group in which the credit characteristics are broadly the same.

	Moody's	S&P	Fitch	Meaning
	Aaa	AAA	AAA	Prime
	Aa1	AA+	AA+	
	Aa2	AA	AA	High Grade
	Aa3	AA-	AA-	
Investment Grade	A1	A+	A+	
	A2	A	A	Upper Medium Grade
	A3	A-	A-	
	Baa1	BBB+	BBB+	
	Baa2	BBB	BBB	Lower Medium Grade
	Baa3	BBB-	BBB-	
	Ba1	BB+	BB+	
	Ba2	BB	BB	Non Investment Grade Speculative
	Ba3	BB_	BB_	
	B1	B+	B+	
	B2	B	B	Highly Speculative
	B3	B-	B-	
Junk	Caa1	CCC+	CCC+	Substantial Risk
	Caa2	CCC	CCC	Extremely Speculative
	Caa3	CCC-	CCC-	In Default w/ Little Prospect for Recovery
	Ca	CC	CC+	
		C	CC	
			CC-	In Default
	D	D	DDD	

2.5 Absence Of Rating

Where no rating has been assigned or where a rating has been withdrawn, it may be for reasons unrelated to the creditworthiness of the issue. Should no rating be assigned, the reason may be one of the following:

i. An application was not received or accepted.
ii. The issue or issuer belongs to a group of securities or entities that are not rated as a matter of policy.
iii. There is a lack of essential data pertaining to the issue or issuer.
iv. The issue was privately placed, in which case the rating is not published in Rating Agency's publications.

Withdrawal may occur if new and material circumstances arise, the effects of which preclude satisfactory analysis; if there is no longer available reasonable up-to-date data to permit a judgment to be formed; if a bond is called for redemption; or for other reasons.

2.6 Changes In Rating

The credit quality of most issuers and their obligations is not fixed and steady over a period of time, but tends to undergo change. For this reason changes in ratings occur so as to reflect variations in intrinsic relative position of issuers and their obligations.

A change in rating may thus occur at any time in the case of an individual issue. Such rating change should serve notice that an Agency observes some alteration in creditworthiness, or that the previous rating did not fully reflect the quality of the bond as now seen. While because of their very nature, changes are to be expected more frequently among bonds of lower ratings than among bonds of higher ratings. Nevertheless, the user of bond ratings should keep close and constant check on all ratings-both high and low-to be able to note promptly any signs of change in status that may occur.

2.7 Limitations To Uses Of Ratings

Obligations carrying the same rating are not claimed to be of absolutely equal credit quality. In a broad sense, they are alike in position, but since there are a limited number of rating classes using in

rating thousands of bonds, the symbols cannot reflect the same shadings of risk which actually exist.

As ratings are designed exclusively for the purpose of grading obligations according to their credit quality, they should not be used alone as a basis for investment operations. For example, they have no value in forecasting the direction of future trends of market price. Market price movements in bonds are influenced not only by the credit quality of individual issues but also by changes in money rates and general economic trends, as well as by the length of maturity, etc. During its life even the highest rated bond may have wide price movements, while its high rating status remains unchanged.

The matter of market price has no bearing whatsoever on the determination of ratings, which are not to be construed as recommendations with respect to “attractiveness”. The attractiveness of a given bond may depend on its yield, its maturity date or other factors for which the investor may search, as well as on its credit quality, the only characteristic to which the rating refers.

Since ratings involves judgments about the future, on the one hand, and since they are used by investors as a means of protection, on the other, the effort is made when assigning ratings to look at “worst” possibilities in the “visible” future, rather than solely at the past record and the status of present. Therefore, investors using the ratings should not expect to find in them a reflection of statistical factors alone, since they are an appraisal of long-term risks, including the recognitions of many non-statistical factors.

Ratings represent the opinion of Credit Rating Agencies as to the relative creditworthiness of securities. As such, they should be used in conjunction with the descriptions and statistics appearing in their publications. Reference should be made to these statements for information regarding the issuer.

2.8 Rating Agencies Consider Themselves as "Journalists"

An interesting/crucial fact is that rating agencies consider themselves as "journalists" and protected under "freedom of speech" first Amendment of the U.S. Constitution Provisions.

Credit agencies claim that are, and must be construed solely as, statements of opinion and not statements of fact or recommendation to purchase, sell or hold any securities. Each rating or other opinion must be weighed solely as one factor in any investment decision made by or on behalf of any user of the information, and each such user must accordingly make its own study and evaluation of each security and of each issuer and guarantor of, and each provider of credit support for, each security that it may consider purchasing, selling or holding.

As credit rating agencies consider their ratings to be opinions, they are likely to argue that enabling a regulator to suspend rating would amount to a restriction of free speech. Employees at rating agencies like to see themselves as "journalists", but in many ways this is because they don't want to be held accountable or liable for what they say. They have to recognize that the role they now have in the financial system gives them a lot of responsibility and they must be a little more open to that and become more accountable to the public about their methodology.

Credit rating agencies pump information provided to them by others and not from the banks, companies or country they rate. But this can cause serious problems in the event that specific information is wrong or false, and by extension lead the agency to erroneous evaluation. Even in this case, however, despite the panic that would cause the agency to investors are protected by law.

The agencies hide behind the claim that they rely on information that provided to them by others, and therefore, they are not responsible for any errors or omissions or for the results obtained from use of that information. Also, they have consistently claimed "they are financial publishers whose ratings are equivalent to newspaper editorials". Several courts have accepted this argument. Further they claim that a

rating is an “unfalsifiable opinion”. Therefore, it is wholly protected, or in the alternative, they claim that it is a matter of public interest and is protected by the “actual malice” standard laid down in New York Times Co. Sullivan. Some courts have accepted this argument. Even Congress took the First Amendment argument seriously when it deliberated about the Credit Rating Agency Reform Act.

This First Amendment defense will have to be litigated further. While “the First Amendment has been held by the Supreme Court to protect the editorial content of (financial) newspapers and newsletters”, -ratings may be distinguished from these. It will remain to be seen whether those distinctions will be constitutional significant.

So, as a conclusion, we could say that there should be some changes in how to assess rating agencies so that only offer their personal opinion (after all, the truth is that journalism is not their work), but they can justify their reports in a meaningful and correct information they have gathered before writing the report. In this way the risk of error substantially reduces and there would not be so many reactions to the way they operate as it exists today.

3. Rating Agencies Basic Objective Function (Economic Contex)

3.1 Reputation And Rating Through The Cycle

Reputation cycles can be decomposed into three phases:

- **Phase 1: reputation building:** reputation which implies that CRAs is very strict: CRAs choose to give a good rating to a few "bad" projects, investors are careful (high credit spreads) since perceived rating accuracy is low.
- **Phase 2: cashing on reputation:** reputation increases, spread decrease. But the CRA becomes more lax, which implies that the probability of crisis rises.
- **Phase 3: crisis of confidence:** the opportunistic CRA is detected, the market loses confidence (reputation brutally falls down to zero), and the market disappears.

Credit Rating Agencies (CRAs) are accused of bearing a strong responsibility in the subprime crisis, by having been too lax in the ratings of some structured products. Many commentators explain this behavior by a fundamental conflict of interest generated by the new business model of CRAs, which collect most of their income from the issuers rather than from the investors.

Another change is due to regulation: since the creation, in 1975, of the status of Nationally Recognized Statistical Ratings Organization (NRSROs) the stakes associated with obtaining a good rating for issuers have increased considerably. This has been reinforced recently by the official recognition of the ratings provided by NRSROs in the computation of regulatory capital requirements for commercial banks in Basel II accord. Finally, it is clear that CRAs have played a crucial role in the fantastic development of structured finance products in the recent

years, and that they have benefited a lot from this development. For example, Moody's net income has grown from $159 in 2000 to $705 in 2006. In response to the accusation of having been deliberately too lax, CRAs essentially argue that such an attitude would be too dangerous for them, since their reputation is a stake.

J. Mathis et al (2009) first show that, when the fraction of the CRA income that comes from other sources (than rating complex products) is large enough, CRA's reputation will be too lax (i.e. will give a good rating to a bad security), and the accuracy of ratings given the reputation of the CRA are simultaneously rational from the respective viewpoints of CRA's and investors, where an opportunistic CRA always tells the truth. In this case, reputation is a good disciplining device for CRAs. By contrast when the fraction of the CRA income that comes from rating complex products becomes large, CRA is always too lax when its reputation is good enough. This implies the possibility of what is known as reputation cycles, consisting of several phases. First, starting from a situation where investors are not very trustful, issuing volumes are low and credit spreads are high, the CRA tries to increase its reputation by being very strict. Then investors become more optimistic, the reputation of the CRA increases, spreads decrease and issuing volume increases. Ultimately there is a default, which provokes a crisis of confidence: the opportunistic CRA is detected, its reputation brutally falls down, spreads become high again and issuing volume decline dramatically. Thus in this case, it may take a long time to detect an opportunistic CRA and the conflict of interest is not solved by reputation concerns: Reputation building creates confidence cycles.

The implications of **Mathis et al (2009)** results are clear:

- Even when monitoring is perfect, it may take a long time to detect an opportunistic CRA.
- The conflict of interest is not solved by reputation concerns.
- Reputation building creates confidence cycles.

The main policy implication is that there is a crucial need for changing the business model of CRAs. Several policy responses are possible. Public

supervision of CRAs seems difficult and counterproductive. Making CRAs legally liable for their ratings (so far viewed as “opinions”) would probably kill the business. Goodhart (2008) proposes another solution, namely to create an independent agency in charge of assessing private ratings. However the main concern is how to eliminate the conflicts of interest. **Mathis et al (2009)** results show that these conflicts of interest are created by the “issuers pay model” (due to free riding, or information leakage).

3.2 Type 1 And Type 2 Error

Morgan (2000), show that greater uncertainty in more opaque sectors will lead to more lopsided splits, at least if one agency tends to rate more conservative in general. Intuitively, the heightened uncertainty in more opaque sectors, implies more risk of overrating (type 1 error) and underrating (type 2 error), but since the conservative rater worries more about overrating, he errs further on the safe side in the more opaque sectors.

Type 1 error: means that an agency upgrades a firm, i.e. the agency say you are not “bad” and the firm proves to be bad and

Type 2 error: means that an agency downgrade a firm, i.e. “you are bad” and you prove to be not “bad”.

Morgan (2000) show that the disagreement between raters over opaque sectors is not symmetric, but lopsided, with one rater lower on average than the other. He developed a simple model to interpret this. The splits will be lopsided in general if one rater happens to be more conservative than the other. The asymmetry between raters will be more pronounced, moreover, in more opaque sectors.

Here is the idea of his model. The splits will be more lopsided, moreover, in the more opaque sectors. Uncertainty about the precise risk of a firm will cause the raters to overrate some risky firms (type 1 error) and underrate some relatively safe firms (type 2 error). In this vain suppose that the rater tests the following null hypothesis conditional on the public and private info she has gathered about the issuer of the bond. In that way the following standard type 1 error and type 2 error will result from the rating assessment.

Type 1 error: means that an agency upgrades a firm, i.e. the agency say you are not "bad" and the firm proves to be bad and

Type 2 error: means that an agency downgrade a firm, i.e. "you are bad" and you prove to be not "bad".

Null hypothesis says that the firm is a bad credit.

$$H_0\text{: x is "bad"}$$

In the case of type 1 error, the agency rejects the null by upgrading the firm, i.e. the agency say you are not a "bad" credit, yet the firm proves exposed to be "bad". While, in the case of type 2 error, the agency does not reject the null hypothesis and downgrades the firm, i.e. the agency say you are "bad" credit and the firm proves exposed not to be "bad".

Given that more easily criticized by investors in the bond market in case of type 1 error simply because the investors would imply loses rating opinion, conservative raters worry more about overrating i.e. make type 1 error, so they choose to err on the safe side by applying tougher standards. The difference in standards cause lopsided splits generally, across all sectors that is. Splits are more lopsided in more opaque sectors, such as banks or insurance firms, because the heightened risk of type 1 error causes the more conservative rater to apply even tougher in the sector. In essence, conservative raters err

further on the safe side in more opaque sectors, implying more lopsided splits.

An interesting problem would be the optimal number of ratings, but for simplicity Morgan used in his model only two **A** or **B**. Although the model is not intended as a complete model of the rating process, it holds in more elaborate settings.

The most serious problem that faces each rater is to choose a cutoff value for converting their noisy numerical estimates of default risk into letter ratings. The probability of default is denoted by ●. The issuer knows this parameter but outsiders, like the raters, must estimate●. The distribution of estimates for each rater is denoted by F (●) and let f denote the associated density function. The uncertainty surrounding the risk of an issue is greater, the wider this density around. Rather than reveal their noisy estimates of ●, raters publish letter ratings. The raters use a cutoff rule to convert their estimates of the ratings: ●≤c⇒A; ●>c⇒B. Given c, the probability (rating=A)≡P(A)=F(●) and P(B)=1-F(c). Let c denote the cutoff.

Misratings can be caused by the uncertainty surrounding the true risk of an issue. Some relatively safe bonds will be underrated (type 2 error) and some relatively risky bonds will be overrated (type 1 error). These mistakes are costly to the raters, because issuers of downgraded bonds will object to their rating, as will the investors in upgraded issues (once they learn the truth). For simplicity, Morgan defined in his model overrating and underrating in an ex post sense, in terms of default. If given an A rating, the issuer defaults, then we will say that the issue was overrated and if given a B rating the issuer does not default, the issue was underrated. Raters in the model are basically trying to sort bonds into “risky” and “safe” categories. If the default rate on the risky B bond is too low, the classification starts to lose meaning and the raters start to lose business.

The costs of overrating and underrating are denoted by C^{o} and C^{u} respectively. We will say that a rater is relatively conservative, if they worry more about upgraded than about downgraded $C^{u}< C^{o}$. But can this

ratio differ across raters? Because these are essentially utility parameters and the raters are different people working at different agencies, this does not seem unreasonable.

Hence, each agency chooses a cutoff value that minimizes the expected costs of overrating and underrating, given their respective costs. These costs vary across raters. Letting D denote default, the optimal cutoff solves:

arg $\min_{c\in[0,1]} E(c)$= C° P(D|A) + Cᵘ P(∼D|B) subject to

P(D|A)≡$\int_0^c \rho f(\rho)/F(c)$

P(∼D|B)≡$\int_c^1 (1-\rho)f(\rho)/[1-F(c)]$

The constraints are just the definitions of upgrading and downgrading. We observe that the probability of overrating rises and the probability of underrating falls as the cutoff c increases. The rate of change in both cases is less than unity in absolute value. The limiting prices of these probabilities are: c→0 ⇒ P (D|A) →0 and P $(\sim D|B) \to 1$; C→1⇒ P(D|A)→1 and P$(\sim \mathrm{D}|\mathrm{A}) \to 0$.

Solving the first order condition we determine the optimal cutoff:

$$\frac{\mathrm{C^u}}{\mathrm{C^o}} = \frac{1-F(c)}{F(c)} \times \frac{c-P(D|A)}{1-c-P(\sim D|B)} \qquad (1)$$

If a rater has symmetric costs (Cᵘ= C°) sets $\overline{\rho}$. Dividing the distribution down the middle implies equal fractions of A and B ratings and equal probabilities of overrating and underrating. But a more

conservative rater ($C^u < C^o$), chooses a lower cutoff value. Clearly, c=ρ is not optimal for the more conservative m. Dividing the distribution equally implies too many A's and too many upgraded issues. Rater m lowers his cutoff until the ratio of costs on the left side of (1) equals the product of ratios on the right.

Split ratings occur whenever the estimates of● by each rater fall on opposite sides of their respective cutoffs. If their cutoffs were the same, splits would still occur but the average rating by each agency would be the same, i.e. the splits would be symmetric. If there are differences between the cutoffs, this will produce lopsided splits, with the more conservative rater on the downside more often. A large gap between their cutoffs implies more lopsided splits.

When the uncertainty increases, drives the raters cutoffs further apart, implying even more lopsided splits in more opaque sectors. The greater uncertainty in sector y implies a wider density around the mean, and hence, a flatter distribution F. Heightened uncertainty in y implies greater risk of both overrating and underrating. The response of each rater to the uncertainty in y depends on the ratio C^u/C^o for each rater.

As the costs of upgrading and downgrading are symmetric, a rater s will not change his cutoff, but the more conservative m, is more sensitive to the increased risk of overrating in y and so he lowers his cutoff. As observed above, a larger gap between the cutoffs implies even more lopsided splits in more opaque sectors.

But the real problem in the past 2007 crisis was revealed following the sub-prime crisis in 2007 was rating inflation of structural (complex) credit products, like ABS, CDO's etc.

3.3 Rating Bias When Complexity rises.

Skreta and **Veldkamp (2009)**, show that in an issuer initiative market for ratings security complexity i.e. securitization transactions, affects that incentive of the issuer to shop for ratings. When asset complexity is small, ratings are precise, but when asset complexity is high, ratings become uninformative. In both cases, issuing multiple ratings has little price impact and is not worth the cost.

Also, they show that security complexity influences the demand for shadow ratings i.e. multiple ratings that have been observed but published only the most favorable by the issuer. When there is no asset complexity and when there is high asset complexity, there is no benefit and only a cost to acquiring either a first or a second rating. In between these extremes, there can be an asset, the complexity in which allow to soliciting more than one rating in order to shop for the best one.

Finally, they found that complexity affects ratings bias. There will always be some probability of ratings shopping whenever ratings are acquired. As complexity rises, two ratings become farther apart on average and thus, the ratings bias generated by when ratings shopping grows. Also, as complexity grows from a low level, more

Skreta and **Veldkamp (2009)** focus on potential bias, not in produced but in reported ratings which lead to ratings shopping. Skreta develop an equilibrium model of market for ratings and used it to examine possible origins of and cures for ratings inflation. In the model, asset issuers before auctioning their assets, can shop for ratings, i.e. observe multiple ratings and disclose only the most favorable. The incentive to ratings shop is low when assets are sufficient simple, because agencies ratings are similar, but the incentive shop emerges when assets are sufficient complex, because of the differences in ratings. There is a threshold level of asset complexity such that once this threshold is crossed, shopping

becomes optimal and ratings inflation emerges. If assets become more complex and harder to rate, then using additional ratings to ratings shop becomes more profitable. If assets become very complex, then ratings are so noisy that investors largely ignore them, so this lead the asset issuers less willing to pay the issuance fee for a rating that will have little impact on the price of their asset. Thus, an increase in the complexity of recently issued securities could create a symmetric bias in disclosed ratings, despite the fact that each rating agency produces an unbiased estimate of the asset's true quality.

3.3.1 Model Description

Skreta and Veldkamp (2009) develop a model in which issuers ask and pay for ratings. There are two **assets**:

- ✓ The "safe" asset, which offers riskless return r, and
- ✓ The risky asset, which pays u and is normally distributed u∼N($\overline{u}, \sigma_u^2$)

The price of the riskless asset is 1 and the price of the risky asset is p, which is endogenous.

Investors don't know the value of the asset and their utility function is

$$U = -e^{-\rho(m_i r + q_i)}, \quad (1)$$

Where ρ is the coefficient of absolute risk aversion and q_i and m_i are the number of risky and riskless asset shares investor i ends up with. Investors choose their utility function so as to maximize their utility, subject to the information that they have. Each agent is endowed with m_i^0 units of the riskless asset, but can borrow and lend that asset freely at the riskless rate r. Hence, each investor's budget constraint is

$$m_i + p q_i = m_i^0 \quad (2)$$

In the **auction** the total supply of the asset is fixed and determined by the issuer. Also, each investor submits a bidding function that specifies the maximum amount that he is willing to pay for q units of the risky asset as a function of his information. These bid functions determine the overall demand. The auctioneer determines a market-clearing price p that is equal to aggregate demand and supply and each trader pays this price for each unit purchased.

The bid function constitutes an equilibrium. Let I_i denote each investor's information, which includes information inferred from b being the price paid per unit.

$$b(q \mid I_i) = \frac{E(u|I_i) - qpV(u|I_i)}{r}, \quad (3)$$

where $E(u|I_i)$ and $V(u|I_i)$ are the mean and the variance of the risky asset's return, conditional on the investor's information. The price an investor faces is determined by other investor's bid functions, together with the aggregate supply, so the price paid per unit is exogenous because he is infinitesimal compared to the rest of the market. Also, information about other bids reveals from price b.

Each bidder is infinitesimal means that he takes the market-clearing price as given. Thus the bidding function (3) is the inverse demand function of a trader who seeks to maximize (1) subject to (2), taking p as given. The objective function of this constrained maximization problem is concave in q, so that the first order condition describes the optimal portfolio:

$$q_i = \frac{1}{p} V(u \mid I_i)^{-1} [E(u \mid I_i) - pr]. \quad (4)$$

Because (3) is an inverse of (4), it is a best response given everyone else's bid function.

When issuers solicit a rating, they either publish the rating to all investors or they keep it private so that no investor has access on it. Either way, investors have symmetric information I. Integrating over the asset demand (4) and equating aggregate demand with the asset supply, delivers the equilibrium price:

$$p=\frac{1}{r}(E(u|I)-\rho Var[u|I]x). \quad (5)$$

Credit Rating Agencies produce ratings, which are noisy, unbiased signals about the risky asset payoff u. Skreta consider two rating agencies for simplicity.

Let ϑ denote a shadow rating, which is an unbiased signal about the payoff. ϑ is normally distributed $\vartheta \sim N(u, \sigma_\vartheta^2)$ and produce a marginal cost $\tilde{\chi}$. Issuers have the choice to disclose the rating or to keep it private. All rating agencies produce the same service. Since there is no quantity choice, there is a Bertrand competition between firms. So, firms set price equal to marginal cost: $\tilde{\chi}$ for shadow ratings and $\chi+\tilde{\chi}$ for publicly issued ratings.

The issuer knows the true payoff of the risky asset and is endowed with x shares of it. His objective is to maximize expected profit. The issuer's expected profit is

$$\Pi=px - \tilde{s}\tilde{\chi} - s\chi, \quad (6)$$

where $\tilde{s}$ is the number of shadow ratings observed, including the ones eventually disclosed and s is the number of publicly disclosed ratings.

In the **Model Timing** there are three stages:

✓ *Stage 1: The issuer's ratings acquisition decision.*

The issuer decides if he will acquire a shadow rating. If he will, he visits one of the two rating agencies. Upon acquiring and observing the first shadow rating, he decides whether or not to acquire another one.

✓ *Stage 2: The issuer's ratings disclosure decision.*

The issuer decides whether to publish no, one or both ratings, depending on the number of acquired shadow ratings.

✓ *Stage 3: Price determination.*

The market clearing price is determined by an auction.

Skreta and Veldkamp (2009) examine two different types of shadow ratings disclosure. They attempt a deeper view of the mandatory and the voluntary disclosure of shadow ratings.

➢ *Mandatory Disclosure Of Shadow Ratings*

In this case the issuer must only decide whether to acquire zero, one or two ratings. Sequentially, first he decides whether to acquire one rating and then upon observing the realization of the first rating, he decides whether it is worthwhile to obtain a second.

The expected price of an unrated asset is

$$p_0 \equiv \frac{1}{r}(\bar{u} - \rho\sigma_u^2 x). \qquad (7)$$

From Bayes law dictates the expected value of the asset is $E(u|\vartheta)=(\sigma_u^{-2}\bar{u}+\sigma_\vartheta^{-2})/(\sigma_u^{-2}+\sigma_\vartheta^{-2})$ and the conditional variance of the asset will be $V[u|\vartheta]= 1/ (\sigma_u^{-2}+\sigma_\vartheta^{-2})$. Since the issuer decides to acquire the rating without knowing its outcome, he considers the expected price

$$\overline{p_1} \equiv \frac{1}{r}(\bar{u} - \rho V(u \mid \vartheta] x) = \frac{1}{r}(\bar{u} - \frac{\rho x}{(\sigma_u^{-2} + \sigma_\vartheta^{-2})}). \quad (8)$$

Hence, the difference in issuer's profits from buying information is:

$$\bar{\Pi}^{M}_{s=1} - \bar{\Pi}^{M}_{s=0} = \frac{\rho x^2}{r} \frac{1}{\sigma_\vartheta^2 \sigma_u^{-4} + \sigma_u^{-2}} - \chi - \tilde{\chi}. \quad (9)$$

$\bar{\Pi}^{M}_{s=1}$ ($\bar{\Pi}^{M}_{s=0}$) denote the issuer's expected profits from acquiring no (respectively one) rating under mandatory disclosure. The issuer chooses to purchase a rating if (9) is non-negative.

With two ratings the assets expected price is:

$$\overline{p_2} = \frac{1}{r}(\bar{u} - \frac{\rho x}{\sigma_u^{-2} + 2\sigma_\vartheta^{-2}}). \quad (10)$$

The issuer choose to obtain two shadow ratings instead of one if

$$\bar{\Pi}^{M}_{s=2} - \bar{\Pi}^{M}_{s=1} = \frac{\rho x^2}{r} \frac{1}{\sigma_\vartheta^2 \sigma_u^{-4} + 3\sigma_u^{-2} + 2\sigma_\vartheta^{-2}} - \chi - \tilde{\chi} > 0. \quad (11)$$

We observe that if (9) is positive, (11) will be positive too. Hence, if the issuer profits from acquiring one shadow rating, he also profits from the second.

The value of the first rating is always decreasing in complexity, because a more complex asset is harder to rate, the resulting rating is less precise and thus less valuable [(9) is decreasing in σ_ϑ^2]. The value of the second rating could also be lower for the same reason, or it could be

higher because having less information from the first rating increases the marginal value of additional information. (9) is increasing in asset complexity if the variance of the asset's returns is high, relative to the complexity of the asset ($2\sigma_u^4 > \sigma_u^2$) and is decreasing otherwise.

Skreta and Veldkamp come to the conclusion that a model with mandatory disclosure of ratings by asset issuers and trustful reporting by rating agencies cannot explain the bias in ratings.

- *Voluntary Disclosure Of Shadow Ratings*

In this case, when issuers withhold the most negative ratings make the asset appear more valuable to issuers and when they decide to disclose more ratings make the asset less risky. Both effects increase the price investors are willing to pay.

Investors do not correct for ratings selection bias, so for every announced rating they believe that $\vartheta \sim N(u, \sigma_\vartheta^2)$ and for unrated assets they believe $u \sim N(\bar{u}, \sigma_u^2)$.

If we assume that the asset complexity suddenly changed and investor's did not observe the change, but that changes in complexity are possible, they would infer asset complexity, hence ratings bias from the past history data of ratings and asset arises. Since these data came mainly from simple assets, investors would believe that assets are simple, that no ratings shopping taking place and thus, that ratings are unbiased. This belief would still persist even after assets became more complex, until many ratings and payoffs from the complex asset observed. Therefore, even rational investors would not detect rating bias, although an unexpected change in asset characteristics made.

When issuer solicits not to disclose any ratings, the asset price is the same whether disclosure is voluntary or mandatory. The issuer has to make a decision about the number of the shadow ratings i.e. one or two, he must solicit.

Suppose that the issuer acquires two shadow ratings. Let $\overline{\vartheta}$ denote the higher rating and $\underline{\vartheta}$ the lower, so that $\overline{\vartheta} > \underline{\vartheta}$. We investigate under which conditions the issuer will disclose none, one or both ratings. If the issuer chooses to disclose one rating, he will definitely publish $\overline{\vartheta}$.

a) <u>One versus Zero Ratings.</u>

No ratings means that the conditional mean and variance of the asset payoff are the unconditional mean and variance, $\bar{u}$ and σ_u^2. The price of the asset is the same as in (7).

If the issuer announces rating $\overline{\vartheta}$, the price of the asset will be:

$$p_1(\overline{\vartheta}) = \frac{1}{r}\left(\frac{\sigma_u^{-2}\bar{u}+\sigma_\vartheta^{-2}\overline{\vartheta}-\rho x}{\sigma_u^{-2}+\sigma_\vartheta^{-2}}\right). \qquad (12)$$

The additional profit from disclosing information is:

$$\Pi_{D=1}(\overline{\vartheta}) - \Pi_{D=0} = [p_1(\overline{\vartheta}) - p_0]\, x - \chi, = \frac{\chi}{r}\frac{x\,\vartheta - \bar{u}+\rho x\sigma_u^2}{1+\sigma_u^{-2}\sigma_\vartheta^2} - \chi. \qquad (13)$$

Where $\Pi_{D=d}$ denotes the issuer's profit from publishing d ratings.

If (13) is positive, the issuer decides to disclose one rating. Let α be the value of $\overline{\vartheta}$ that causes (13) to be zero. The asset issuer publish at least one rating if $\overline{\vartheta} \geq \alpha$, because (13) is monotonically increasing in $\overline{\vartheta}$. Hence, in voluntary ratings disclosure, the issuer publishes one versus no ratings when the rating obtained is high enough.

b) <u>One versus Two Ratings.</u>

If the issuer discloses both $\overline{\vartheta}$ and $\underline{\vartheta}$, the asset price will be:

$$p_2(\overline{\vartheta}, \underline{\vartheta}) = \frac{1}{r}\left(\frac{\sigma_u^{-2}\overline{u}+\sigma_\vartheta^{-2}(\overline{\vartheta}+\underline{\vartheta})-\rho x}{\sigma_u^{-2}+2\sigma_\vartheta^{-2}}\right). \quad (14)$$

The issuer prefers to publish both ratings if:

$$\Pi_{D=2}(\overline{\vartheta}, \underline{\vartheta}) - \Pi_{D=1}(\overline{\vartheta}) = [p_2(\overline{\vartheta}, \underline{\vartheta}) - p_1(\overline{\vartheta})]\, x - \chi,$$

$$= \frac{\chi}{r}\frac{(\sigma_\vartheta^{-2}\sigma_u^{-2}(\underline{\vartheta}-\overline{u})+\sigma_\vartheta^{-4}(\overline{\vartheta}-\underline{\vartheta})+\rho x\sigma_\vartheta^{-2})}{(\sigma_u^{-2}+2\sigma_\vartheta^{-2})(\sigma_u^{-2}+\sigma_\vartheta^{-2})} - \chi > 0. \quad (15)$$

Let b ($\overline{\vartheta}$) denote the value of $\underline{\vartheta}$ that equates (15) to zero when the highest rating is $\overline{\vartheta}$. The issuer discloses both ratings if $\underline{\vartheta} \geq$ b ($\overline{\vartheta}$), since (15) is monotonically increasing in $\underline{\vartheta}$.

The issuer prefers to shop- i.e. publish only the highest of the two ratings- when $\underline{\vartheta}$ is sufficiently lower than $\overline{\vartheta}$, $\underline{\vartheta} <$ b ($\overline{\vartheta}$).

Finally, the issuer will disclose no ratings, if no ratings are preferable to one rating and two ratings. These conditions are satisfied both if $\overline{\vartheta} < \alpha$.

All the previous results when an issuer has solicited two shadow ratings summarized in the table below.

Disclose both ratings if $\overline{\vartheta} \geq \alpha$ and $\underline{\vartheta} \geq$ b ($\overline{\vartheta}$).
Disclose highest rating if $\overline{\vartheta} \geq \alpha$ and $\underline{\vartheta} <$ b $(\overline{\vartheta})$.
Disclose no ratings if $\overline{\vartheta} < \alpha$.

But what if the issuer has acquired only one shadow rating? Let now $\overline{\vartheta}$ denote that rating. The issuer prefers to disclose if (13) is positive ($\overline{\vartheta} \geq \alpha$) and does not publish otherwise.

But how many ratings acquisition the issuer wants? The issuer makes two decisions sequentially. First, he decides whether to acquire the first shadow rating and then he decides whether to acquire the second one. **Skreta and Veldkamp** work in their model with backward induction. They start with an issuer who already has a shadow rating and has to make a decision whether to obtain a second. Let ϑ_1 denote the first shadow rating and ϑ_2 the second.

The issuer decision about the second rating depends on whether the first rating is high enough to publish ($\vartheta_1 \geq \alpha$). We have to examine two cases.

i. *Case 1: The first rating was high ($\vartheta_1 > \alpha$).*

- ✓ The second rating is low relative to the first (ϑ_2<b (ϑ_1)). The issuer decides to publish only the first rating ϑ_1.
- ✓ The second rating is sufficiently high to disclose and not so high that it makes the first no longer worthwhile to disclose (b(ϑ_1)<ϑ_2<ϑ^*), then the issuer publishes both ratings.
- ✓ The second rating is sufficiently higher than the first, so the issuer discloses only the second.

ii. *Case 2: The first rating was low ($\vartheta_1 < \alpha$).*

- ✓ The second rating is low (ϑ_2<α). The issuer will not publish any ratings.
- ✓ The second rating is moderately high, then the issuer will probably disclose both ratings, even though the first was too low to disclose on its own.
- ✓ The second rating is high ($\vartheta_2 > b^{-1}(\vartheta_1)$), so the issuer decides to publish only the second rating.

As mentioned above, **Skreta and Veldkamp** work backwards, so the next step is to examine the decision to acquire the first shadow rating. If the first rating is too low to disclose, may prompt the issuer to acquire a second rating or may deter the acquisition of a second rating. This holds even if the first rating is high enough. This may motivate the issuer to solicit a second rating or to prevent him from soliciting a second rating.

3.3.2 Main Results

We analyze the main results of **Skreta's and Veldkamp's** publication below.

First of all, complexity affects the incentive to shop for ratings. When asset complexity is small, ratings are precise. The extent to which disclosing a second rating reduces the risk of investing in the asset is too small to be worth the cost. But, when asset complexity is high, ratings become uninformative. Hence, since investors know this, issuing multiple ratings has little price impact and is again not worth the cost.

Secondly, complexity influences the demand for shadow ratings. When there is no asset complexity, each rating is perfectly precise. So, there is no benefit and only a cost to soliciting a second rating. When asset complexity is very high, ratings are uninformative. Therefore, again, there is no benefit and only a cost to acquiring either a first or a second rating. In between these extremes, there can be an asset, the complexity in which allow to soliciting more than one rating in order to shop for the best one. But if that is the case, then rising complexity must cause the net benefit of a second rating to rise and then fall.

Finally, complexity affects ratings bias. As asset complexity rises, a firm with two average ratings publishes one, then two and then one again. But the issuer will not always draw average ratings. Therefore, there will always be some probability of ratings shopping whenever ratings are acquired. Also, as complexity rises, two ratings become farther apart on average and thus, the ratings bias generated by when ratings shopping grows. Moreover, there is a change in ratings acquisition. As complexity grows from a low level, more issuers get a second rating, enabling them to choose the highest one to publish. When asset complexity becomes very large, bias plummets. This corresponds to the level of complexity where issuers no longer want to solicit any shadow ratings, because ratings contain too little information to be worth the cost.

Beyond Industrial Organization Issues in the market for ratings another reported area is the use of ratings financial participants. In particular ratings hardwiring, which has attacked a lot of attention these days and we are going to discuss in the next chapter.

4.Ratings Hardwiring

Ratings hardwiring relates to the mechanical response of the investment decisions to ratings. This can result interalia. This come result from regulatory rules and internal charter procedures of investment firms. Rating agencies are used to facilitate monitoring the risks of investments by regulatory entities. Securities and Exchange Commission rule 2a-7 (SEC 2a-7) restricts money market funds from investing in commercial paper below a rating threshold. Insurance companies and pension funds face similar rules. Moreover, banks, insurance companies, broker-dealers and other regulated entities, such as Basel II Capital Accord, EU Solvency II Directive, SEC rule 15c3-1, use ratings extensively in determining capital adequacy buffers for them and to set collateral requirements by central banks for the provision of liquidity to the banking system. Many institutional investors also, are forced from their own charter to sell securities whose rating has crossed some critical threshold. The demand and the supply of a rated security could impact by ratings hardwiring, affecting information pooling and the signaling role of prices. This stands even more when the investors are subject to ratings-based rules and regulatory restrictions and the market for rated securities dominated by them.

Also, all assets accepted by the Eurosystem as eligible collateral must meet the minimum requirement (or "credit quality threshold") of a credit assessment of a minimum long-term rating of "BBB-" by Standard and Poor's and Fitch or "Baa3" by Moody's.

Especially for Asset-Backed Securities (ABSs) the general credit quality threshold for use as collateral in Eurosystem credit operation is defined as an "AAA" rating level by Fitch, Standard's & Poor's or "Aaa" rating level by Moody's at issuance and "A-" level by Standard's & Poor's or "A3" level by Moody's over the lifetime of the transaction on a second-best basis. ABSs with a second-best rating of at least "triple B" (which means at least "Baa3" from Moody's or "BBB-" from Fitch and Standard's & Poor's) in the Eurosystem's harmonized rating scale at issuance and at all times subsequently, and with underlying assets which comprise residential mortgages, loans to small and medium-sized enterprises (SMEs), commercial mortgages, auto loans, consumer finance loans or leases, are also eligible for use as collateral in Eurosystem credit operations, if they fulfill certain specific criteria.

With regard to retail mortgage-backed debt instruments, the Eurosystem's threshold is a credit assessment of a minimum long-run rating of "A-" by Standard's and Poor's, Fitch or "A3" by Moody's.

Other than for updating investor's beliefs about ratings securities, ratings are used in modern financial markets in the context of regulatory use and as part of market practices that provide for the mechanical response of investors to rating changes. For example, a number of institutions, such as pension funds and insurance companies, are not allowed to hold securities below "BBB-" in the Standard and Poor's and Fitch or "Baa3" in Moody's or other relevant scale. Also, internal charter procedures may restrict fund managers from holding securities below a certain rating threshold. All these cases of mechanical response to rating changes are referred to as ratings hardwiring.

The most famous distinction among credits that is based in ratings is the investment/sub-investment dichotomy defined by the "BBB-" in Standard's and Poor's and Fitch rating and "Baa3" in Moody's rating. (Above "BBB-" or "Baa3": investment grade, below "BBB-" or "Baa3": sub-investment grade.)

Hardwiring on ratings aims at resolving a principal-agent problem a la Jensen and Meckling, where the principal (who is the investor in present case) partly controls action of the agent (fund manager) by linking her investment decisions on publicly observed signals, such as ratings. Same is true when regulators that recognize their limited capacity to regulate and supervise in continue time financial institutions. Therefore, they implicitly "subcontract" such a monitoring responsibility to rating agencies.

For years, such a hardwiring of regulatory and investment decisions on ratings had proved to be convenient and a "cheap" solution to difficult monitoring problems. In times of crises it has possibly amplifies market turbulence by causing forced sales of securities (e.g. Greek Government Bonds-GGB's), which has led to a rapid increase in credit conditions (credit spreads), that feed into market settlement weighing heavily on the economic environment.

Pagratis (2012) show that asset prices could be affected by the mechanical response of investment decisions to rating changes, the so called ratings hardwiring. He show that predictable supply shocks that

caused by ratings hardwiring, induce informed traders to overreact to new information. The idea of his model is described below.

4.1 Credit Ratinsg And The Eusrosystem Credit Assessment Framework (ECAF)

In the section below, we will describe the use of ratings for regulatory purposes from European Central Bank (ECB). The Eurosystem has developed a single framework for eligible assets common to all Eurosystem credit operations. This aims in protecting the Eurosystem from incurring losses in its monetary policy operations and of ensuring the equal treatment of counterparties, as well as of enhancing operational efficiency and transparency, underlying assets have to fulfill certain criteria in order to be eligible for Eurosystem monetary policy operations.

Two distinct asset classes, marketable assets and non-marketable assets, are comprised by this single framework. No distinction is made between the two asset classes with regard to the quality of the assets and their eligibility for the various types of Eurosystem monetary policy operations, except that non-marketable assets are not used by the Eurosystem for outright transactions. The assets eligible for Eurosystem monetary policy operations can also be used as underlying assets for intraday credit.

The eligibility criteria for the two asset classes are uniform across the euro area. To ensure that the two asset classes comply with the same credit standards, a Eurosystem credit assessment framework (ECAF) has been set up, which relies on different credit assessment sources. The procedures and rules establishing and controlling the Eurosystem's requirement for "high credit standards" for all eligible collateral are outlined below.

4.1.1 Eurosystem's Credit Assessment Framework (ECAF)

The procedures, the rules and the techniques which ensure that the Eurosystem requirement of high credit standards for all eligible assets is met is defined by the Eurosystem credit assessment framework (ECAF). In order to take account of the different legal nature of marketable assets and non-marketable assets and for operational efficiency reasons, the Eurosystem differentiates between thee assets.

The Eurosystem takes into account credit assessment information from credit assessment systems belonging to one of four sources, namely External Credit Assessment Institutions (ECAIs), NCBs In-house Credit Assessment Credits (ICASs), counterparties Internal Ratings-Based (IRB) systems or third-parties providers Rating Tools (RTs). Additionally, guarantees which are institutional criteria and features guaranteeing similar protection for the instrument holder are taken into account in the assessment of the credit standard by the Eurosystem.

Focusing on ECAIs, which are the three most known rating agencies, Standard's and Poor's, Moody's and Fitch, the high credit standards for marketable assets are established on the basis of the following criterion. One credit assessment from an accepted ECAI for the issue (or for the issuer) must comply at least with the Eurosystem's credit quality threshold. This means, that if multiple and possibly conflicting ECAI assessment are available for the same issuer/debtor or guarantor, the first-best rule (i.e. the best available ECAI credit assessment) is applied.

The Eurosystem's benchmark for marketable assets for establishing its minimum requirement for high credit standards –its "credit quality threshold"—is defined in terms of a credit assessment of credit quality step 3 (see the table below) in the Eurosystem's harmonized rating scale. A credit quality step 3 credit assessment means a minimum long-term rating of "BBB-" by Standard and Poor's and Fitch or "Baa3" by Moody's. The probability of default that is being considered by the Eurosystem over a year horizon of 0,40% is equivalent to a credit assessment of credit quality step 3, subject to regular review. The

Eurosystem publishes the lower rating grade meeting the required credit quality threshold for each accepted ECAI, without assuming any responsibility of its assessment of the ECAI, again subject to regular review.

With regard to asset-backed securities, the Eurosystem's benchmark for establishing its minimum requirements for high credit standards is defined in terms of "triple A" credit assessment at issuance, which means a long-term of "AAA" BY Fitch, Standard and Poor's or "Aaa" by Moody's. Over the lifetime of the asset-backed security, the Eurosystem's minimum credit quality threshold of credit quality step 2 of the Eurosystem harmonized rating scale "single A" must be retained. "Single A" means a minimum long-run rating of "A-"by Standard's and Poor's, Fitch or "A3" by Moody's.

In the case of RMBDs, the Eurosystem's benchmark for establishing its minimum requirement for high credit standards is defined in terms of a credit assessment of credit quality step 2 in the Eurosystem's harmonized rating scale, "single A". The Eurosystem considers a probability default over a one year horizon of 0,10% as equivalent to a credit assessment of credit quality step 2, subject to regular review.

			Credit Quality Steps	
ECAI Credit Assessment		**1**	**2**	**3**
	Fitch Ratings	AAA/AA+/AA/ AA-	A+/A/A-	BBB+/BBB/BBB-
LongL-term	**Moody's**	Aaa/Aa1/Aa2/ Aa3	A1/A2/ A3	Baa1/Baa2/Baa3
	Standard and Poor's	AAA/AA+/AA/ AA-	A+/A/A-	BBB+/BBB/BBB-

4.2 Pagratis (2012) Model Description

Pagratis (2012), show in his paper that with risk aversion, the higher the ratings hardwiring is, price informativeness falls more quickly and price volatility increases. Moreover, when ratings hardwiring is high enough at low levels of risk aversion, price informativeness almost disappears, while as risk aversion increases, price informativeness disappears at lower levels of ratings hardwiring. Also, when hardwiring is observed, informed traders react more aggressively to new information.

Ratings hardwiring, induce a stronger reaction of prices to fundamental innovation, a larger misinterpretation and overreaction by traders to errors in their private signals, increases price overreaction to the random supply of the risky asset and finally we observe that the undue price impact of rating signal errors is higher.

Ratings hardwiring results support the current provisions of the Dodd-Frank Act for gradually abolishing the use of ratings for regulatory purposes.

In **Pagratis (2012)** model there is a competitive market for a risky asset, in which traders are informed and uninformed. There are two types of informed traders (type α and type β) demanding in each period quantities q_t^{α} and q_t^{β} of the risky asset. There are also uninformed traders called noise traders whose net supply of the asset is denoted by S_t in every period. Pagratis defined models ratings hardwiring by decomposing S_t into a purely noise part ς_t and a hardwiring element namely a linear decreasing function of the rating.

$$S_t=\varsigma_t+\psi r_t \qquad (1)$$

He shows that even that simple specifications of hardwiring are a noisy rational expectation equilibrium (NREE) prices tend to become less informative and more volatile as the extend of hardwiring ψ in the market increases. That is despite of holding the overall unconditional variance of aggregate net supply S_t constant as he varies ψ.

More specifically, in the model D_i denotes the dividend payoff of the risky asset in every period t, depending on ϑ_{1t} and ϑ_{2t} which are two fundamental realization factors and a transitory component u_t.

$$D_i=\vartheta_{1t}+\vartheta_{2t}+u_t \tag{2}$$

ϑ_1 and ϑ_2 are orthogonal factors to each other and follow stationary autoregressive AR(1) process with persistence parameters ρ_1 and ρ_2.

$$\vartheta_{1t}=\rho_1\vartheta_{1t-1}+u_{1t}\ ,\ \vartheta_{2t}=\rho_2\vartheta_{2t-1}+u_{2t} \tag{3}$$

Where $\{u_t\}$, $\{u_{1t}\}$ and $\{u_{2t}\}$ are i.i.d. normal with mean zero and variance σ_u^2, σ_{1v}^2 and σ_{2v}^2 respectively. Moreover we assume that ϑ_1 is more persistent than ϑ_2, i.e. $|\rho_2|<|\rho_1|<1$.

Traders care only about next period's wealth and they have CARA preferences over future wealth and trade conditionally on prices. So, the current price can infer information to them, at which their limit orders are settled.

Informed traders have a special price discovery skills, specialize in one fundamental factor by observing private information and they observe dividends and public ratings that produced by a rating agency for the risky asset. Depending on the type of private information, traders are divided into two classes j=1, 2. Proportion α corresponds to class 1 and 1-α to class 2.

Uninformed traders, who are called noise traders, trade both for ratings hardwiring reasons and for non-fundamental (liquidity) purposes.

Non fundamental trading is a not predictable random supply of the asset and in contrast with that, hardwiring implies the supply partly, depends on ratings and becomes forecastable to a certain extent.

4.2.1 Hardwiring Investment Decisions To Ratings

Uninformed traders are represented by the random supply of the risky asset, which may partly depend on ratings. We think a case where law or statute, force some investors to sell the asset if a rating falls below a certain threshold. By forecasting such a possible scenario, a high/low rating one period could induce low/high supply to the asset. Recommendations on overall buying and selling depending on price levels from an analyst could cause similar effects. In those cases, the supply of the asset in the market is affecting by positive or negative recommendation, because this recommendation could trigger noise trading.

$$S_t = -\psi r_t + \varsigma_t \qquad (4)$$

Where S_t denote the supply, r_t the rating, ψ the hardwiring parameter and ς_t a random component due to non-fundamental trading.

Hardwiring parameter $\psi \geq 0$ means that S_t correlates negatively with the asset rating and $\{\varsigma_t\}$ is i.i.d normal with mean zero and variance σ_ς^2 and orthogonal to all other noise terms in the model.

The unconditional variance of the asset supply is $\sigma_S^2 = \psi^2 \sigma_r^2 + \sigma_\varsigma^2$ from (4) and the variance of ς_t for any given level of the unconditional variance of the asset supply σ_S^2 is $\sigma_\varsigma^2 = \sigma_S^2 - \psi^2 \sigma_r^2$, for $|\psi| < \frac{\sigma_S}{\sigma_r}$.

4.2.2 Private Information And Public Ratings

Class 1 traders specialize in the high persistence factor ϑ_{1t} by observing signals s_t^1, while traders of class 2 who specialize in the low-persistence factor ϑ_{2t} by observing signals s_t^2.

$$s_t^1=\vartheta_{1t}+\eta_{1t}\ ,\ s_t^2=\vartheta_{2t}+\eta_{2t} \tag{5}$$

Where $\{\eta_{1t}\}$ and $\{\eta_{2t}\}$ denote idiosyncratic noise terms, are i.i.d. normal, orthogonal to each other and to all other terms in the model, with mean zero and variances $\sigma_{1\eta}^2$, $\sigma_{2\eta}^2$ respectively.

We think that the role of the rating agency for the risky asset plays an exogenous non-trading and non-strategic agent. The rating agency in the model receives private noisy information about the asset and makes public the updated rating with one period lag. In this model, the best estimate of the fundamentals of the asset using as information only the history of the private information of the agency, neglecting the information reflected in the price and payoff of the asset, reflected by ratings.

A summary statistic is expressed by the rating r_t, namely an unbiased estimator of the sum of the two fundamental factors, conditional on the history of the agency's private information.

$$r_t=\mathrm{E}\ [\vartheta_{1t}+\vartheta_{2t}\,|\,s_{1t}^r, s_{2t}^r, \mathrm{s}<\mathrm{t}] \tag{6}$$

Where s_{1t}^r and s_{2t}^r are signals about ϑ_{1t} and ϑ_{2t}, contaminated by idiosyncratic noise

$$s_{1t}^r=\vartheta_{1t}+e_{1t}\quad ,\quad s_{2t}^r=\vartheta_{2t}+e_{2t} \tag{7}$$

$\{e_{1t}\}$ and $\{e_{2t}\}$ are i.i.d. normal with mean zero and variance σ_{1s}^2 and σ_{2s}^2 respectively, orthogonal to $\{u_t\}$, $\{u_{1t}\}$, $\{u_{2t}\}$, $\{\eta_{1t}\}$ and $\{\eta_{2t}\}$.

4.2.3 Trader Forecasting Rules

Considering as mentioned above the assumption that traders are myopic and care only about next period's wealth, Sargent (1991) and Hussman (1992) show that ARMA (1,1) forecasting rules are optimal in the sense that informed agents would have no incentive to increase in order of either the AR or the MA part to further improve their forecasts. We also assume that informed traders perceptions about the law of motion of their observable variables are assumed to be of the general ARMA (1, 1) form

$$z_{jt+1}=\mathbf{A}_j z_{jt}+\varsigma_{jt+1}+\mathbf{C}_j\varsigma_{jt} \quad , \quad \text{j=1, 2} \tag{8}$$

Where $z'_{jt} \equiv[p_t, D_t, s_t^j]$, ς_{jt+1} is the vector of conditional forecast errors and $\mathbf{A}_j$, $\mathbf{C}_j$ are matrices of ARMA coefficients.

Recasting (8) we get

$$x_{jt+1}=\mathbf{B}_j x_{jt}+\nu_{jt+1} \quad , \quad \text{j=1, 2} \tag{9}$$

Where $x_{jt} \equiv \begin{bmatrix} z_{jt} \\ \varsigma_{jt} \end{bmatrix}$ is the vector of variables that informed traders observe in period t, including their realized forecast errors ς_{jt} , $\nu_{jt+1}=\begin{bmatrix} \varsigma_{jt+1} \\ \varsigma_{jt+1} \end{bmatrix}$, $\mathbf{B}_j \equiv \begin{bmatrix} \mathbf{A}_j & \mathbf{C}_j \\ 0_4 & 0_4 \end{bmatrix}$ and 0_4 is a 4×4 matrix of zeros.

Equation (9) is used by informed traders to forecast x_{jt+1} on the basis of observable x_{jt}.

$$E[x_{jt+1} \mid x_{jt}] = \mathbf{B}_j x_{jt} \quad , \quad J=1, 2 \tag{10}$$

4.2.4 Preferences And Trader Optimization

Each period, informed traders decide the amount they will invest in the risky asset, or in a safe bond. They reach their decisions by maximizing their expected utility and inferring as much as possible about the asset from information I_{jt} they have observed up to period t. Let q_t^j denote their optimal demands for the risky asset in order to maximize their expected CARA utility over next period's wealth w_{t+1}^j.

$$q_t^j = \text{Arg}_{q_t^*} \max E[-\exp(-w_{t+1}^j/\varphi_j) \mid I_{jt}] \quad , \quad j=1, 2 \tag{4a}$$

Subject to

$$w_{t+1}^j = R\,(w_t^j - q_t^* p_t) + q_t^* (p_{t+1} + D_{t+1}) \tag{4b}$$

where R is the constant gross interest rate on the safe bond.

The following optimal demand is given by the maximization problem above.

$$q_t^j = \varphi_j \frac{E[p_{t+1} + D_{t+1} \mid I_{jt}] - R p_t}{Var[\varsigma_{jt+1}^p + \varsigma_{jt+1}^D]} \quad , \quad j=1, 2 \tag{11}$$

where ς_{jt+1}^p and ς_{jt+1}^D are the conditional forecast errors for p_{t+1} and D_{t+1} respectively, that result from trader forecasting rules in (8).

4.2.5 Market Clearing

We assume that a central auctioneer aggregates trader's optimal demand. Therefore, let p_t denote the equilibrium price, which is set to satisfy the market-clearing condition

$$\alpha q_t^1+(1-\alpha)\ q_t^2=S_t \tag{12}$$

where q_t^1 and q_t^2 are agents optimal demands for the risky asset, as given by (11) and S_t is the supply of the risky asset, as given by (3).

Substituting (11) into (12) the price process p_t becomes

$$p_t=\Lambda^{-1}[\alpha\sigma_2^2\varphi_1 E_1[\cdot]+(1-\alpha)\ \sigma_1^2\varphi_2 E_2[\cdot]-\sigma_1^2\sigma_2^2 S_t] \tag{13}$$

Where $E_j[\cdot]\equiv E[p_{t+1}+D_{t+1}\,|\,I_{jt}]$, $\sigma_j^2=Var[\varsigma_{jt+1}^p+\varsigma_{jt+1}^D]$, for j=1, 2 and parameter Λ is given by

$$\Lambda\equiv R[\sigma_2^2\alpha\varphi_1\ +\sigma_1^2(1-\alpha)\ \varphi_2] \tag{14}$$

Subjective measures of riskiness σ_j^2 and subjective beliefs $E_j[\cdot]$ are determined both in equilibrium on the basis of investors perceived laws of motion.

The next step is to introduce our measure of price informativeness that allows us to gauge the impact of ratings hardwiring on the information content of asset prices. As a benchmark for comparison with our baseline scenario of incomplete and asymmetric information, we consider prices under complete information.

4.2.6 Complete Information Benchmark

We assume that the realization of fundamental factors in each period observed perfectly by informed traders, but they still remain uncertain about their future realizations. Let ς_t denote the net supply of the risky asset, be deterministic in every period and equal $\bar{\varsigma}$. So, in that case the price in every period becomes sufficient statistic with respect to both fundamental factors and the model is characterized by common knowledge ϑ_{1t} and ϑ_{2t}. Hence, by the law of the iterated expectations and by solving (13), the full information price p_t^* becomes

$$p_t^*=E_t[\sum_{t=1}^{\infty} R^{-1}\, D_{t+i}]-\frac{\sigma^2\bar{\varsigma}}{(\varphi_1+\varphi_2)(R-1)} \tag{15}$$

Where σ^2 is the unconditional variance of $p_t^*+ D_t$.

Substituting forward ϑ_{1t} and ϑ_{2t} and from (2) and (15), we express the full information price in terms of the current realization of fundamental factors

$$p_t^*=\frac{\rho_1}{R-\rho_1}\vartheta_{1t}+\frac{\rho_2}{R-\rho_2}\vartheta_{2t}-\frac{\sigma^2\bar{\varsigma}}{(\varphi_1+\varphi_2)(R-1)} \tag{16}$$

4.2.7 Information Content Of Prices Under Signal Extraction

Signal extraction causes some problems. That is because the amount of information about ϑ_{1t} and ϑ_{2t} conveyed in p_t may be different from the complete information benchmark p_t^*. The expected squared difference of p_t minus p_t^*, conditional on ϑ_{1t} and ϑ_{2t} capture the information content of prices.

$$\text{V=E}\,[(p_t - p_t^*)^2\,|\vartheta_{1t}, \vartheta_{2t}] \tag{17}$$

Where p_t^* is given by (16) and p_t is determined in equilibrium.

Equation (17) can be written as

$$V=\text{Var}(p_t|\vartheta_{1t},\vartheta_{2t})+[E(p_t|\vartheta_{1t},\vartheta_{2t})-p_t^*]^2 \quad (18)$$

The variable vector $[p_t \quad \vartheta_{1t} \quad \vartheta_{2t}]$ follows a multivariable distribution with unconditional mean **μ** and covariance matrix **Σ**, in case of incomplete and asymmetric information. Given that model's disturbance terms have mean zero and that model's processes have no drift, $\boldsymbol{\mu}'=[0 \quad 0 \quad 0]$ and the covariance matrix **Σ** is determined in equilibrium. Let σ_p^2 be the unconditional variance of p_t, $\Sigma_{p\vartheta}$ the vector of covariance of p_t with $[\vartheta_{1t} \quad \vartheta_{2t}]$ and $\Sigma_{\vartheta\vartheta}$ the covariance matrix of $[\vartheta_{1t} \quad \vartheta_{2t}]$. The distribution of p_t, conditionally on ϑ_{1t} and ϑ_{2t}, is normal with

$$(p_t|\vartheta_{1t},\vartheta_{2t})\sim N\left(\Sigma_{p\vartheta}\Sigma_{\vartheta\vartheta}^{-1}\begin{bmatrix}\vartheta_{1t}\\ \vartheta_{2t}\end{bmatrix},\sigma_p^2-\Sigma_{p\vartheta}\Sigma_{\vartheta\vartheta}^{-1}\Sigma_{p\vartheta}'\right) \quad (19)$$

ϑ_{1t} and ϑ_{2t} are orthogonal, which means that the covariance matrix $\Sigma_{\vartheta\vartheta}$ is diagonal and from (18), (19) we have

$$V=\sigma_p^2-\left(\frac{\sigma_{p\vartheta_1}^2}{\sigma_{\vartheta_1}^2}+\frac{\sigma_{p\vartheta_2}^2}{\sigma_{\vartheta_2}^2}\right)+\left(\frac{\sigma_{p\vartheta_1}}{\sigma_{\vartheta_1}^2}\vartheta_1+\frac{\sigma_{p\vartheta_2}}{\sigma_{\vartheta_2}^2}\vartheta_2-p_t^*\right)^2 \quad (20)$$

Or, by substituting p_t^* from (16)

$$V=\sigma_p^2-\left(\frac{\sigma_{p\vartheta_1}^2}{\sigma_{\vartheta_1}^2}+\frac{\sigma_{p\vartheta_2}^2}{\sigma_{\vartheta_2}^2}\right)+\left[\left(\frac{\sigma_{p\vartheta_1}}{\sigma_{\vartheta_1}^2}-\frac{\rho_1}{R-\rho_1}\right)\vartheta_1+\left(\frac{\sigma_{p\vartheta_2}}{\sigma_{\vartheta_2}^2}-\frac{\rho_2}{R-\rho_2}\right)\vartheta_2-\Phi\right]^2 \quad (21)$$

Where Φ=$\frac{\sigma^2\bar{\varsigma}}{(\varphi_1+\varphi_2)(R-1)}$ and $\sigma_{p\vartheta_j}$ is the covariance of price p_t with ϑ_{jt} , j=1,2.

As a measure of the information content of prices, V depends on the realization of fundamental factors we use its unconditional expectation

$$\bar{V}=\sigma_p^2-(\frac{\sigma_{p\vartheta_1}^2}{\sigma_{\vartheta_1}^2}+\frac{\sigma_{p\vartheta_2}^2}{\sigma_{\vartheta_2}^2})+(\frac{\sigma_{p\vartheta_1}}{\sigma_{\vartheta_1}^2}-\frac{\rho_1}{R-\rho_1})^2\sigma_{\vartheta_1}^2+(\frac{\sigma_{p\vartheta_2}}{\sigma_{\vartheta_2}^2}-\frac{\rho_2}{R-\rho_2})^2\sigma_{\vartheta_2}^2+\Phi^2 \quad (22)$$

Where $\sigma_{\vartheta_j}^2$, j=1, 1 is the unconditional variance of ϑ_{jt}.

We observe that $\sigma_{\vartheta_j}^2$ is exogenously determined by (3), i.e. $\sigma_{\vartheta_j}^2=\frac{\sigma_{jv}^2}{1-\rho_j^2}$, while the unconditional variance of price σ_p^2 and its covariance $\sigma_{p\vartheta_j}$ with ϑ_{jt} are determined in equilibrium.

4.2.8 Outline Of Solution Concept

Information sets $I_{jt}=\{p_s,\ D_s,\ r_s,\ s_s^j;\ s\leq t\}$, j=1, 2, characterize informed traders, and these information sets are records of data z_{jt} of the form

$$z_{jt}=[p_t,\ D_t,\ r_t,\ s_t^j] \quad (23)$$

All variables that are collectively observed by traders, the two latent factors ϑ_{1t} and ϑ_{2t}, the random supply ς_t and the conditional forecast errors ς_{jt} that depend on trader's information set and

forecasting rules are including by the state vector z_t that describes the market in period t.

$$z_t'=\begin{bmatrix} p_t & D_t & r_t & s_t^j & \vartheta_{1t} & \vartheta_{2t} & \varsigma_t & \varsigma_{1t} & \varsigma_{2t} \end{bmatrix} \quad (24)$$

Therefore, all noise term in the period t, specified by vector ε_t

$$\varepsilon_t'=[u_t \quad \eta_{1t} \quad \eta_{2t} \quad v_{1t} \quad v_{2t} \quad e_{1t-1} \quad e_{2t-1} \quad \varsigma_t] \quad (25)$$

Where u_t, η_{jt}, v_{jt}, ς_t and e_{jt} are the innovators and are defined in (2), (3), (4), (5), (6), (7) respectively.

Also, we consider the following timing of events and information in every trading round t:

i. Based on information up to t-1, rating r_t is publicly announced.
ii. Traders observe public and private information, fundamentals are updated and submit optimal demand schedules to a Walrasian auctioneer.
iii. The rating agency makes a rating in period t+1, but before this receives information about the current level of fundamentals.

The natural lag between ratings and prices is captured by the sequence of events. That means, innovations in ϑ_1 and $\vartheta_2$are reflected first into prices and then into ratings. Moreover, the sum of the two latent factors ϑ_1 and ϑ_2 consider having from the rating process in (6) an unbiased estimator.

4.2.9 Results

Pagratis (2012), show that depending on model parameters, risk shifting and price exploitation motives interact in equilibrium affecting prices in various ways.

- *Risk aversion*

The risk-sharing motive, when higher risk aversion increases. As a result, that tends to dominate the motive to exploit information and thus, higher risk aversion leads to less informative prices.

Also, price volatility depends both on the degree of price informativeness and serial correlation. On the one hand, because prices become more informative, i.e. more responsive to fundamental innovations, they may become more volatile and on the other hand, the higher the serial correlation of prices the higher the unconditional variance of the price process.

Moreover, rational traders are aware that risk sharing dominates information exploitation in a market with higher risk aversion. That leads the price to become less informative, which declines the accurate forecasts. Given that all traders have common knowledge about the long-run mean of the price process, less accurate forecasts induce traders to respond more aggressively to temporary price deviations from the mean, in anticipation of subsequent mean reversion. So, in equilibrium prices are characterized by stronger mean reversion and higher serial correlation and volatility.

- *Rating hardwiring*

Ratings hardwiring affect the impact of risk aversion on the information content and volatility of prices. The higher the ratings hardwiring the more quickly price informativeness falls and price volatility increases with risk aversion.

In the case of low level of risk aversion, price informativeness almost disappears as the proportion of noise-trading volatility attributable to ratings hardwiring is high enough. As risk aversion increases, price informativeness disappears at lower levels of ratings hardwiring.

Lower price informativeness and higher price volatility may be caused by hardwiring of trading decisions to ratings, because it leads to supply shocks to the asset become, to a certain extent, predictable and correlated with the fundamentals. Hence, hardwiring creates a channel through which the shocks to fundamentals are amplified and tend the informed traders to react more aggressively to new information.

4.2.10 Impulse Response

Traders may face signal extraction problems, including non-fundamental innovations, so this can have a persistent price impact. That is because, signal extraction problems block traders from accurately identifying whether changes in observable variables are due to fundamental or non-fundamental shocks. As a result, non-fundamental noise may be misinterpreted by traders as being fundamental information. That may last for some time, until they finally filter out the actual realization of past fundamental shocks.

In case that a degree of ratings hardwiring characterize the market, shocks to the supply of the asset become correlated with the fundamentals and to a certain extent predictable. So, traders might become overly sensitive to any elements of information about dividends and capital gains that are directly linked to supply shocks through market clearing.

Moreover, there is a price impact of fundamental shocks. We notice that a stronger reaction of prices to fundamental innovation induced with hardwiring, compared to the case without hardwiring. Also, larger misinterpretation and overreaction by traders to errors in their private signals observed in the case of hardwiring, compared to the

situation without hardwiring. The only parties who observe their private signals are the informed traders. As a result, the induced price overreaction to private signal errors is exclusively due to more aggressive trading by informed traders, rather than stemming directly from noise trading.

There is additional an impact of rating signal errors on prices. When ratings hardwiring is observed, the undue price impact of rating signal errors is higher. Also, the extent of ratings hardwiring increases price overreaction to the random supply of the risky asset. Finally, as with private signal errors above, the only parties who consider dividends among their observables are the informed traders. Therefore, any price overreaction to non-fundamental dividend shocks is exclusively due to trader overreaction to the shocks and to no other reason.

We conclude this chapter with the common opinion of an increasing theoretical and empirical literature, who claim that it is possibly the use of rating scores by regulators and market participants that leads to destabilize markets in periods of stress/crisis, rather than ratings per se.

5.Procyclicality Of Sovereign Credit Ratings

Ferri, Liu and Stigkitz (1999), demonstrated that the procyclical nature of rating agencies sovereign ratings may have contributed to aggravate the Easy Asian financial crisis. The results from their econometric model illustrate that rating agencies attached higher weights to their qualitative judgment than to the economic fundamentals both reflected in their pre-crisis ratings and post-crisis rating downgrades, thereby exhibiting procyclical nature of rating assignment. Ultimately, the boom and bust cycle in East Asia, may have helped to exacerbate by such behavior. They also explain why rating agencies became excessively conservative after having made blatant mistakes in predicting the East Asian crisis, by proposing an endogenous rationale. Specifically, rating agencies would have an incentive to become more conservative so as to recover from the damage these mistakes caused to them to rebuild their own reputation capital.

On the other hand, **Mora (2005)**, argued that the case for the guilt of sovereign credit rating agencies is not tenable and she claimed that there is a little support for assigned ratings being excessively conservative during the crisis period from 1997 to 1998. In the case when country fixed effects are not included, ratings are found to be sticky rather than procyclical. While, she provided support for the FLS (Ferri, Liu, Stiglitz) findings that predicted ratings were lower than assigned ratings during the period prior to the crisis, which is consistent not only to the FLS view, but also to inertia view. Furthermore, she mentioned that ratings are not found to be predicted higher than assigned during the crisis period and this weakens the FLS view. A significant advantage of her study is that the sample period extends to the post-crisis period from 1999 to 2001. This helped reveal inertia in ratings. During the period of crisis (when country fixed effects are not including), predicted ratings are found to be higher than assigned ratings. Therefore they capture the crisis, but remain over-conservative after the crisis. Moreover, she showed that when there was a sufficiently large divergence of predicted ratings from assigned ratings, ratings adjust. She also found that in a model where ratings react passively to market sentiment, then the drying up of credit might be attributed to excessive downgrading, even though it would have occurred regardless. Finally, she showed that ratings found to be influenced by a country's default history, which may be capturing political factors that are value-relevant.

In this chapter we will discuss the opinion that rating agencies do not look through the cycle. In other words, rating agencies have been blamed for producing higher ratings when the economy grows and lower ratings when the economic cycle turns. As a result, they are thought to be responsible for amplifying the current and past sovereign debt crisis.

First of all, we will examine rating procyclicality from **Ferri, Liu and Stiglitz (1999)** paper on the Asian crisis and on the other hand we will take a look on the defense of sovereign ratings by **Mora (2005)**.

5.1 The Procyclical Role Of Rating Agencies

The role of credit rating agencies in the financial markets is very important. Their main output consists of assigning credit ratings to sovereign and private sector borrowers throughout the world. Also, financial markets rely on rating agencies, for constantly updating the credit ratings they have assigned to issuers. The financial markets benefit from these ratings, because an estimate of the probability that borrowers will not fulfill the obligations specified in their debt issues, is offered. The higher the rating, the lower is such probability and vice versa. Accordingly, issuers with lower ratings must pay higher interest rates, embodying larger risk premia, than higher rated issuers. Furthermore, besides affecting the cost at which issuers can borrow, ratings determine the extent of potential investors. Specifically, statutes and regulations either forbid institutional investors to invest in assets carrying ratings below a certain level or they require extra capital to be posted. These assets are referred to as “below-investment-grade” or “speculative” assets.

In 1997 and 1998, many observers pointed out that rating agencies’ had failed to preventively warn the markets against the East Asian crisis. International financial institutions unanimously blamed rating agencies for their inability to forecast the East Asian crisis. Rating agencies admitted that they made mistakes and defend themselves saying that the East Asian crisis had different features with respect to the past.

This contributed rating agencies to become excessively conservative. Specifically, they downgraded East Asian crisis countries more than the worsening in these countries economic fundamentals would justify. Such rating agencies actions unduly exacerbated, for these countries, the cost of borrowing abroad and caused the supply of international capital to them to evaporate. In turn, lower than deserved ratings contributed, at least for some time, to amplify the East Asian crisis. Because of their failure to predict the emergence of the crisis, rating agencies had an incentive to become more conservative, so as to recover from the damage these errors caused to them and to rebuild their own reputation.

5.1.1 Excessive Downgrading In East Asia

Rating agencies occasionally reveal their rating criteria via their industry publications, although they never disclose their quantitative methodology on how they assign sovereign ratings. Cantor's and Packer's (1996) paper, based on statements of major credit rating agencies, have identified eight quantitative criteria as the determinants of the sovereign rating:

i. Per capita income
ii. GDP growth
iii. Inflation
iv. Fiscal balance
v. External balance
vi. External debt
vii. Economic development
viii. Default history

Most of these variables are closely related to the ratings assigned and the predictive ability of these variables is quite impressive. Although this model is useful in figuring out the basic criteria the rating industry uses, it does not compare the magnitude of changes required by economic fundamentals before and after the rating changes. In other

words, it does not answer the question of whether ratings assigned have a procyclical characteristic in the event of a sovereign economic stress.

Cantor and Packer model considered as the basic sovereign credit rating model which rating agencies used before the East Asian financial crisis. The model may not have fared well after the crisis given the fact that rating agencies had all missed the symptoms of the tumultuous economic events in Asia, rather than lead the event by forewarning investors before and during the crisis. In fact, the rating agencies have also realized the vulnerabilities of the pre-crisis models and have publicly acknowledged the problem. A Fitch report, points out the importance of the short-term debt associated with foreign currency lending. Furthermore, in the report mentioned that other factors that were missed in their watch-list, such as total external debt including sovereign and private debt, transparency in policy and data, exchange rate regime and the competency level of policy makers during the crisis, are important factors in determining sovereign ratings. In the same spirit, Moody's emphasizes the importance of the short-term debt too. They use a new debt sustainability indicator, the ratio of current account balances plus short-term foreign currency debt over foreign exchange reserves, to measure a country's short-term foreign currency liquidity condition. Thus it can be concluded that the important difference of the rating agencies model after the East Asian financial crisis is perhaps to put more emphasis on short-term foreign currency debt in evaluating sovereign risk.

In the process of assigning ratings to sovereign countries, rather than using quantitative model-generated ratings alone, rating agencies also apply qualitative judgment based on a set of country specific, ad hoc, information. Therefore, rating agencies can express the actual ratings as a function as two determinant parts: ratings generated from quantitative models that reflect the sovereign country's economic fundamentals and ratings generated from ad hoc country information that reflect rating agencies qualitative judgments.

$$Ratings=\omega_q Ratings_q+\omega_j Ratings_j$$

$$\omega_q+\omega_j=1$$

Where *Ratings* represents the actual ratings assigned by rating agencies, ω_q is a numerical weight attached to $Ratings_q$ which is assumed to be generated from a quantitative model that reflects the sovereign country's economic fundamentals. ω_j is a weight attached to $Ratings_j$ which is assumed to be generated from rating agencies ad hoc judgment. Actual ratings are thus a weighted average of $Ratings_q$ and $Ratings_j$. Hence, if the actual rating is lower than the model-generated rating from economic fundamentals, this perhaps implies that rating agencies attach a higher weight to their qualitative or idiosyncratic judgment than to the ratings generated from economic fundamentals and vice versa.

So, the strategy to discern whether credit ratings are procyclical becomes clear. **Ferri, Liu and Stiglitz (1999)**, focused on an econometric model based on a set of criteria of sovereign countries economic fundamentals singled out by major rating agencies. They compare model-generated ratings with the actual ratings assigned by the rating agencies. If the ratings generated from a model of economic fundamentals are consistently higher (or lower) than the actual ratings assigned for a country, then the ratings assigned from the qualitative judgment part tend to undermine (or overstate) the ratings generated by the economic fundamentals and thus, they clearly indicate that rating agencies tend to use their idiosyncratic judgment to modify the ratings generated by the economic fundamentals. In doing so, rating agencies may behave in a manner that may potentially generate procyclical sovereign ratings. This could happen during a systemic economic crisis. If rating agencies did not forewarn investors about possible sovereign risks before the crisis, one of the indications could be that they tended to assign ratings above the ratings predicted by the economic

fundamentals. However, as an economic crisis occurs, they tend to overly downgrade sovereign ratings so as to protect their reputation capital. Such a sovereign rating pattern indicates that rating agencies might have exacerbated the already worsening economic fundamentals by hastening capital outflows and causing future capital inflows to evaporate. Should such an event take place, we would conclude that credit ratings have a procyclical effect on a country that is in an economic turnoil.

5.1.2 Are Credit Ratings Procyclical? Evidence From East Asia

The four high-growth dynamic East Asia economies, before the East Asia financial crisis, were consistently higher than the economic fundamentals would warrant. Moreover, after the crisis, the actual ratings dropped much more sharply than the model-predicted ratings, suggesting that rating downgrades were larger than the economic fundamentals would warrant.

Also, it is apparent that rating agencies attached higher weights to their qualitative judgment than they gave to the economic fundamentals both in pre- and post-crisis rating assignment, thereby exhibiting a pattern that when the economy is booming, economic fundamentals are also disregarded.

Furthermore, there is the case where appears to be a convergence between model-generated ratings and actual ratings, a year after the financial crisis. This is not difficult to explain. Since rating assignments have tremendous power to influence market expectations on a country and, to a certain extent, the ratings can affect investor's portfolio allocation decisions they may subsequently undermine macroeconomic fundamentals of the country. As macroeconomic fundamentals of the country deteriorate, model-predicted ratings also tend to decline and thereby converge with actual ratings, though with a lag. Thus, we may just be observing a self-fulfilling prophecy.

5.1.3 Why Are Credit Ratings Procyclical?

Ferri, Liu and Stiglitz (1999) argue that the reason that credit ratings are procyclical is the reputation incentives faced by rating agencies. Specifically, credit rating agencies depend on their reputation capital and, if their reputation capital fluctuate procyclically, they may have an incentive to set ratings procyclically.

Millon and Thakor (1985) demonstrate that information gathering rating agencies may arise in a world of informational asymmetries and moral hazard. According to them, in a setting in which true firm values are certified by screening agents whose payoffs depend on noisy ex post monitors of information quality, the formation of information gathering agencies is justified for two reasons. The first reason is that is enables screening agents to diversify their risky payoffs and the second is that it allows information sharing.

But, Millon and Thakor (1985) assume perfect knowledge by the information gathering agency about the underlying risk of the borrower and do not take into account the case that investors may want to verify ex post the quality of the information provided by rating agencies.

In a more general setup, one would like to model the effort of and the payoffs to the rating agency (Kuhner 1999 argues that, in a systemic crisis, their payoffs may lead rating agencies to an equilibrium in which they pool “good” borrowers together with “bad” borrowers). Specifically, it is likely that rating agencies payoffs worsen when these agencies reputation capital is lowered. Considering that rating agencies reputation capital suffered as a result of their poor performance as the East Asian crisis unfolded, then it seems reasonable to hold that rating agencies had an incentive to become more conservative so as to rebuild their reputation capital.

A similar reasoning why rating agencies may have an incentive to become more conservative after a major crisis has caught them by surprise, would account for rating agencies incentive to be less conservative during an expansionary period. In fact, during an

expansionary period, these agencies reputation capital is likely to be high. Hence, rating agencies do not need to worry about rebuilding their reputation and can indulge in more rating assignments.

5.2 Ratings Are Found To Be Sticky Rather Than Procyclical

According to Ferri, Liu and Stiglitz (1999) (FLS), the credit rating agencies unduly amplified the crisis when they excessively downgraded the countries later and more than the worsening in their economic fundamentals would justify and as a result they fail to predict the East Asian crisis. This would occur if as a result the cost of borrowing increased and the potential pool of investors declined due to statuary requirements. **Mora (2005)** examine if ratings have tremendous power to influence market expectations on a country, or whether they are simply reacting, without contributing, to news.

Sovereign credit ratings have important implications for international capital flows and for the linkages between company ratings and sovereign ratings. **Mora (2005)**, investigate the behavior of sovereign credit ratings, focusing on the East Asian crisis and whether the rating agencies aggravated the crisis by excessively downgrading those countries. The key advantage of her study (and the difference from Ferri, Liu and Stiglitz) is the extension of the period of analysis to the post-crisis period, 1999-2001, allowing for a comparison of pre- and post-crisis rating behavior.

Also, **Mora (2005)**, explore the FLS results. She found that ratings are sticky rather than procyclical. Assigned ratings exceeded predicted ratings in the run up to the crisis, mostly matched predicted ratings during the crisis period and did not increase by the amount suggested by predictions in the recent period after the crisis. Her study includes data from the post-crisis period, which helped reveal the inertia in ratings. Therefore, they capture the crisis but are over-conservative in the period following the crisis. It takes a sufficient amount of either bad (or good) news to change in the direction of the news. Moreover, lagged spreads

and a country's default history are factors that found to lead ratings to react.

It does not imply that ratings have considerable market impact, although they appear to lag financial markets. While the second part of the statement is true when ratings are sticky, the first part does not follow. Ratings are probably not contributing much in new information in the market.

5.2.1 Suspicions Against Procyclical Ratings And An Alternative Approach

Mora (2005) found some specification problems for the FLS model. These problems are the use of random effects, the use of the minimum agency's (Moody's) rating in a year instead of the average and neglecting to account for the potential influence of non-macroeconomic variables. The latter are market sentiment and a country's default history and finally, the choice of a linear specification may be a further problem.

For the reasons above, **Mora (2005)**, discuss an alternative estimation methodology that is preferable to the linear model on theoretical grounds, the ordered probit model, which has been applied to sovereign credit ratings by Hu et al. (2002).

5.2.2 Evaluating Model Predictions

- *Comparing predicted to assigned ratings: Higher or lower*

Mora (2005) claim that the FLS result is not particularly robust to the different specifications. In the simple linear model without country fixed effects, default history and spreads, predicted ratings were higher than actual during the crisis period. The interesting part is that in the period prior to the crisis, predicted ratings were not as high as the period during the crisis and considerably higher than the period during

the crisis in the period after crisis. This lends support to an inertia view of ratings if they are predicted solely based on a country's macroeconomic factors. Ratings adjust during crisis times to their predicted levels and not excessively so. However, as predicted ratings improve during the post-crisis period (a period that was not yet analyzed at the time of the FLS paper), ratings do not adjust as fast upwards. This is comparable to their behavior in the run up to the crisis when it takes a large enough amount of bad news to cause a downgrading in ratings. The comparable ordered probit model also exhibits sticky behavior.

Once country fixed effects are included, an interesting result occurs. Firstly, including country dummies considerably improves the fit of the model. Secondly, the cross-year variation in predicted ratings from actual ratings is largely reduced. This can be explained, because of the introduction of fixed country effects. Fixed country effects would leave the macroeconomic variables with little variation to explain across the countries. Because that is the major source of variation, then it would not be surprising that the distribution does not change much from year to year.

Finally, when including lagged spreads to the explanatory variables, the sample of observations is reduced. Predicted ratings are lower than actual ratings during the pre-crisis period, lower during the post-crisis and even lower during the crisis period compared with the pre-crisis period.

As a conclusion, the claim that actual ratings were excessively conservative during the crisis period has a little support. Ratings are found to be sticky rather than procyclical, when the country fixed effects are not included. While there is support for the FLS finding that predicted ratings were lower than assigned ratings during the period prior to the crisis, there is no support for their being predicted higher than assigned during the crisis period. The advantage of **Mora's (2005)** paper is that it extents the sample period to the post-crisis period for two additional years. This helped reveal the inertia problem. In the case the fixed effects are not included, predicted ratings are found to be

higher than assigned ratings during this period. Under the hypothesis that ratings are procyclical, assigned ratings should be higher than predicted during this upturn. Finally, when country's fixed effects are included, there is no evidence of either procyclicality or stickiness.

- *Comparing predicted to assigned ratings: Distribution of distance*

Mora (2005) found that there is no bias during the crisis period. With the Kolmogorov-Sminov (KS) test statistic, rejects the null hypothesis that the pre-crisis and crisis distributions are the same for the FLS model. For the other models without country fixed effects, the KS test continues to support this result. Also, the hypothesis that the post-crisis and crisis distributions are the same is rejected. Therefore, in the model without country fixed effects there is support for sticky ratings. These models suggest that the pre-crisis distribution is skewed left but also that the post-crisis distribution is skewed right. This would imply that ratings exhibit inertia rather than procyclicality. Moreover, the crisis and post-crisis are not consistent with the FLS view, although the pre-crisis behavior is consistent with both the FLS and the inertia views. An additional support for inertia in ratings is that the distance in skewed right in the post-crisis period. In the specifications with country fixed effects, all three distributions are the same and the hypothesis for identical distributions cannot be rejected.

- *Comparing predicted to assign ratings: Country specific evidence*

Mora (2005), shown that the country specific evidence does not much support the FLS view of procyclicality. The results appear to be more consistent with inertia in rating decisions. There may be fixed costs to the agencies when changing an assigned rating and it takes a sufficient amount of either good or bad news to change in the direction of the news. It looks like ratings are overreacting during the crisis period,

when coming from a period of apparent overexcitement. When to the most part, they are realigning to their predicted values. Ratings also appear to be not only affected by macroeconomic news, but also by market sentiment and default histories. It is also possible, that some fundamentals that are not captured by the limited macroeconomic variables, such as country-specific political factors, are reflected by market sentiment and default histories.

6.Conclusion

Credit rating agencies have severely downgraded the Greek, Irish, Portuguese and other European Union (EU) economies and banks since the onset of the Greek debt crisis in 2009. For some commentators and policy makers rating agencies have amplified and precipitated that debt crisis in the EMU, creating "self fulfilling prophesies" and impeding the orderly resolution of the crisis through policy initiatives.

A good question is if all these commentators and policy makers must sue rating agencies for "treating the EU countries so badly" nowadays? The answer is probably easy, as we saw above in the current thesis, and is no. Although there are cases where credit rating agencies looks to affect financial markets, there is mixed evidence in the strand of literature focusing on rating causality regarding to sovereign debts. Larrain et al. (1997) and Reisen and von Maltzan (1998) find that negative announcements significantly raise sovereign bond yield spreads as well as bond and stock market volatility especially for emerging markets. They also test Granger causality and find a bi-directional causality. They are thus skeptical that rating announcements lead the market and instead think that rating changes might intensify the boom-bust cycle. They show that before the rating change, spreads move in the anticipated direction.

Furthermore, Kaminsky and Schmukler (2002), take a similar view to FLS that ratings amplify the boom-bust cycle. They find that sovereign debt rating changes and outlooks affect not only bonds but also stocks and influence cross-country contagion. However, the daily nature of their data limits controlling for country fundamentals and rating actions may be dependent on spread movements. Their results suggest that ratings exacerbate the boom-bust cycle but they find that downgrades took place as markets were already collapsing. In a previous paper Kaminsky and Schmukler (1999), find that market downturns are usually reversed within the following 10 days after a negative news event, such as rating downgrades. Reinhart (2001) also casts doubt on the effect of ratings. She finds that bond and stock market spreads remain largely unchanged, while ratings are lagging indicators.

Moreover, Ferri et al. (2001) and Monfort and Mulder (2000) focused on the possibility of increased destabilization because Basel II incorporates the use of ratings for risk weightings. Ferri, Liu and Majnoni find that linking bank capital adequacy requirements to external ratings would have a negative effect on developing countries. First of all, in developing countries ratings are not widely available for firms. Secondly, firms in developing countries are highly linked to their sovereign rating and this would expose them to similar negative effects arising from the use of procyclical ratings in Basel II. Monfort and Mulder report simulations that show that linking capital requirements to ratings would have led to a large increase in these requirements during crisis periods after decreasing them prior to the crisis. They call for requirements to instead be countercyclical.

As we can understand there are no chances for anyone to succeed in case of suing rating agencies for influencing financial markets in the crisis period.

In sum rating-related frictions are:

i. Hardwiring
ii. Procyclicality
iii. Selected Default (SD) Status

Hardwiring and procyclicality are two reasons that rating agencies blamed for affecting the financial markets. In the near future we must find the way to solve these problems and so, rating agencies and financial markets can be independent.

Greece downgraded to Selective Default Status, when its debt problems decided to address, among other things, with a PSI. What happened all this time that Greece was downgraded in SD status? Nothing happened. There was no disorderly bankruptcy as had given as a de facto consequence by many “experts”. Greece stayed in this status during execution PSI and then upgraded.

Hence, there is no hard evidence against sovereign ratings of rating agencies. We should consider what caused the European crisis and find

solutions, instead of discovering invisible enemies and making enemies that have no responsibility for the creation of the crisis.

We can conclude that solicited ratings affect financial markets, instead of unsolicited ratings (i.e. sovereign ratings).

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