A necessary Evolution:
Structure, Problems and Change Concepts for the Credit Rating Industry

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Alexander Kiennast
Matrikelnummer 0927572

an der
Fakultät für Informatik der Technischen Universität Wien

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Betreuer/in: Ao. Univ. Prof. Mag. Dr. Gerhard Hanappi

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Abstract

This thesis explores the role of credit rating agencies (CRAs) on the financial market. The history, structure and business model of the rating industry will be examined, based on an extensive study of relevant literature, also including working papers and legislation by public authorities.

Based on this overviews, it will be examined in how far external credit ratings of bad quality can have a destabilising influence on the markets and what might be the reasons for biased ratings. As a consequence it will be shown, that conflicts of interest, together with related dynamics, do indeed factor into the ratings released by CRAs, which in turn deteriorates market stability.

Building on this, various possible ways to address these concerns will be presented and evaluated. The ideas of a changed remuneration system for rating agencies, of an European intermediary rating platform and of supplementing external ratings in legislatory frameworks with market measures will be specifically discussed.

These topics will then form the basis of an agent-based model in NetLogo. This model will be used to simulate the dynamics that credit ratings induce in the financial market as well as the potential impact of the reform concepts described in the preceding chapter. The evaluation of this simulation model and its results in context of the theoretical part of the paper will then form the conclusion of the thesis.

Declaration

Alexander Kiennast, Herbeckstraße 98/4, 1180 Wien

„Hiermit erkläre ich, dass ich diese Arbeit selbständig verfasst habe, dass ich die verwendeten Quellen und Hilfsmittel vollständig angegeben habe und dass ich die Stellen der Arbeit – einschließlich Tabellen, Karten und Abbildungen –, die anderen Werken oder dem Internet im Wortlaut oder dem Sinn nach entnommen sind, auf jeden Fall unter Angabe der Quelle als Entlehnung kenntlich gemacht habe."

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Location, Date, Signature

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I, Introduction

Credit-Rating-Agencies (CRAs) are a significant factor in the modern economy. During the last 40 years, their sphere of influence has spread to all important parts of the financial market. Not only that, as was recently seen during the Euro-Crisis, the ratings provided by CRAs can have an impact on national and trans-national economies as well. Furthermore, financial regulatory standards like the BASEL-accords, strongly rely on ratings provided by external agencies, thus effectively elevating the market position of CRAs and backing up their influence with official authority. When considering these aspects, one should bear in mind, that credit rating is an extremely concentrated industry, with three companies holding a market share of about 95%[1]. These three companies, Moody's, Fitch and Standard & Poors are based in the US and capable of exerting global influence on the financial markets.

In Europe, political leaders are becoming aware of the economical importance and partial dependency on the ratings of these American companies. In recent years, especially the case of Greece has shown the potential immediate impact of ratings issued by these agencies. Deeming this situation unfavourable, the EU has officially adopted a policy to reduce the influence of CRAs[2] [3]. Various possible measures towards this end have been put in place or are being investigated and the topic is at this time highly relevant from a political perspective. However, despite there being many scientific papers dealing with credit ratings, there is no current and comprehensive review on the industry, its problems and possible solutions for these issues.

The goal of this thesis is therefore to identify the main problems and benefits in restructuring the credit rating industry. Furthermore, an agent-based simulation will be used in order to support and visualize the results of this paper. Summarized, this work should provide an answer to the following questions: "What are the structural weaknesses of the credit rating industry?" And consequently: "How could a reform be implemented in order to support more stable financial markets?"

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[1] See Sibert (2011)

[2] See Directorate General Internal Market and Services (EU) (2014)

[3] See Financial Stability Board (2014)

In order to investigate all important aspects of this problem, it is necessary to introduce the reader to the wider context of the research question. Therefore, the first part of the thesis will provide an overview on the history, methods and influence of the credit rating agencies. A main focus of this chapter will lie on the time frame since the start of the financial crisis and geographically on the European theatre. Furthermore, the current position of the EU in regards to the US based CRAs will be examined. This will include an overview on advances and measures towards limiting the influence of these agencies made within the last years.

The second part of the paper will then build upon the context provided by the previous chapters and investigate the core of the research question itself. Therefore, the main issues of the credit rating industry and ways to remedy these problems will be evaluated.

These strategies will form the core of an agent-based simulation, which will be constructed and analysed in the fourth part of the work. The aim of this simulation is to validate the proposed strategies in a simple model environment. This will also provide an easy way to visualize the points made in the thesis and make them more accessible to the reader.

II, Credit Ratings and Rating Agencies

1, The business of credit ratings

Credit risk rating is basically the assignment of relative probabilities of default, represented by a range of rating levels ('notches') for debt instruments. A Credit Rating Agency (CRA) is a company, whose business model is to give such ratings to debt issuers, who pay for this service. To give an overview, the figure below is a table of rating grades and nomenclature used by the largest three rating agencies:

Moody's		S&P		Fitch	
Long-term	Short-term	Long-term	Short-term	Long-term	Short-term
Aaa	P-1	AAA	A-1+	AAA	F1+
Aa1		AA+		AA+	
Aa2		AA		AA	
Aa3		AA−		AA−	
A1		A+	A-1	A+	F1
A2		A		A	
A3	P-2	A−	A-2	A−	F2
Baa1		BBB+		BBB+	
Baa2	P-3	BBB	A-3	BBB	F3
Baa3		BBB−		BBB−	
Ba1	Not Prime	BB+	B	BB+	B
Ba2		BB		BB	
Ba3		BB−		BB−	
B1		B+		B+	
B2		B		B	
B3		B−		B−	
Caa1		CCC+	C	CCC+	C
Caa2		CCC		CCC	
Caa3		CCC−		CCC−	
Ca		CC		CC	
		C		C	
C		RD	D	DDD	D
/		SD		DD	
/		D		D	

Figure 1 - Rating table of Moody's, S&P, Fitch[4]

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[4] See http://en.wikipedia.org/wiki/Credit_rating, 05.04.2015

Thus, on an abstract level, credit ratings are a method to bridge the information asymmetry between issuers and investors. Usually a debt issuer is in a comparatively good position to judge his own probability of default for a emitted debt instrument, as he usually has full information on his own assets. An external investor has not nearly so much insight and will try to avoid a pecuniary loss by charging a risk premium corresponding to the perceived risk of default for an instrument. In doing this, he cannot rely on information provided by the debt issuer, who has a clear economical interest in keeping the risk premium as low as possible[5]. According to theory, by contracting an external agent, namely the CRA, to look into and judge the riskiness of an instrument, both sides of a deal can profit: the investor can more accurately judge the risk associated with the debt, whereas the issuer can expect to get a lower risk premium than might be requested by an uninformed, yet cautious, buyer, as well as finding it easier to attract investors in the first place[6].

According to the ideal, the CRA will in turn do everything that can be expected, in order to provide and maintain accuracy in its ratings. The main incentive of the agency for this is to maintain its good reputation. Being essentially based on trust of the investors in the agency's reliability, the ratings are without value, if this reputation is damaged[7]. To ensure a high quality, risk ratings are continuously monitored by the agencies and updated as necessary. The rating models usually are quite robust in respect to short-term effects on the markets, and up-, or downgrades occur, when new relevant information on a subjects long-term reliability comes to light[8][9].

This view is criticized by some sources however, as being overly simplified and optimistic. Especially the 'issuer pays' model in use with the rating agencies, whereby the entities being rated pay for this service, can be seen as a conflict of interest, as will be shown in the following chapters of this work. Specifically the practice of 'rating shopping' is debated as a potential contributor to the agency's misperformance during the recent financial crisis[10]. This term describes the problem, that the issuer of a bond will, all other factors being similar, be inclined to contract the agency with the most lenient standards, in order to obtain favourable ratings and interest rates. This can lead to a downward spiral in rating standards, when the CRA's have to compete for their customers[11].

[5] See Dittrich (2007)

[6] See Dittrich (2007)

[7] See Dittrich (2007)

[8] See Dittrich (2007)

[9] See White (2010)

[10] See The Issing Committee (2009)

[11] See Benmelech, Dlugosz (2009)

Furthermore, credit ratings nowadays carry an important role in many financial regulatory frameworks. As will be seen, favourable credit ratings are required for entering certain markets, or fulfilling capitalization quotas required by legislation[12]. A prominent example for such rating-based-regulation are the BASEL standards, the most current of which, BASEL III, is currently being implemented. Following the example set by official authorities, credit risk ratings were also adopted as an important benchmark in many risk management departments of various companies. Therefore, the ratings can also serve the function of making various debt instruments more comparable to each other[13].

As to the structure of the credit rating industry itself, the most striking fact, that immediately becomes apparent, is its extreme concentration. Currently, the worldwide credit rating business is practically split between just three companies. Moody's and S&P's collectively hold a global market share of about 80%, with Fitch being represented by about 15%, for an industry grand total of 95% for just these three companies[14]. The reasons for this distribution and the historical development towards this state will now be described in the next sub – chapter.

2, A historical overview on CRAs

In order to understand how a literal handful of companies can occupy such a unique and influential position in today's economical world as the CRAs do, some knowledge of their history is indispensable. Sylla's 'Historical Primer on the Business of Credit Ratings' (2001)[15] gives a good overview of this topic.

The first point that comes to attention in this matter, is that the credit rating business is both an American innovation, as well as a very young industry. This is remarkable, because the first country widely credited with inventing the modern stock and bond markets, was the Dutch Republic, at the beginning of the 17th century. In 1602, the Dutch East India Company started trading its shares at the stock exchange, thus innovating this way of raising funds[16].

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[12] See White (2010)

[13] See Dittrich (2007)

[14] See Sibert (2011)

[15] See Sylla (2001)

[16] See Sylla (2001)

Within the next century, the Dutch Empire, whose wealth and influence was at its peak during this time, had set up a financial system, encompassing many forms of derivates and debt instruments. Other European nations, foremost the British Empire, soon followed this approach and built their own financial structures[17].

Still, it was only roughly 300 years later, in 1909 and located in the USA that John Moody founded the first company that made its business with rating bonds and has done so ever since[18]. This might raise the question, why it is that rating agencies did not develop through the three centuries of preceding history. The causality behind that can be explained from the kind of bonds, that were traded before the 19th century. In earlier times there was no influential bond market for privately owned enterprises. Usually such bonds were emitted by national governments or state-controlled companies, like for example the British East India Company. Smaller businesses in need of capital made use of bank loans or stock issues instead[19].

As described above, the very purpose of a rating agency is to provide an estimate for the probability that a party will fulfil his/her obligations arising from a financial debt. In the markets of the time, which did not contain a lot of volatile assets to begin with, it was taken as a given fact, that a national entity would be able and willing to honour its debts. Thus, in a bond market dominated by sovereign debt, where default risk and trust were no central issues, there was no customer need for a form of CRA[20].

When we now take a look at North America in the 19th century, we will find, that the situation there was different and indeed did support the development of credit ratings. The economy in the US was expanding rapidly during that time. Large enterprises were able to operate on a continental scale, unhindered by national borders. On the other hand, the pronounced federalism of the US meant that the local governments of many states did not have sufficient capital to fuel ongoing infrastructural developments in the young country on a grand scale[21].

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[17] See Sylla (2001)

[18] See Sylla (2001)

[19] See Sylla (2001)

[20] See Sylla (2001)

[21] See Sylla (2001)

The banking sector in America likewise was fragmented along the boundaries of the composite states, thus also not able to provide the funding, that was required especially by the expanding railway companies. These corporations were mostly privately owned and grew rapidly as the century progressed into its second half. At some point they had reached a size where support from state governments and loans from local banks simply were not sufficient to provide the necessary capitalization for further growth. It was therefore logical, that a flourishing domestic and international trade in US railroad company bonds ensued[22].

This bond market was by its nature very volatile and offered the opportunity for large gains, coupled with a much higher risk than the trade in government debts. Also the sheer number and wide geographical distribution of emerging private business in this century of economical growth made it quite impossible for any single investor to have a comprehensive overview of the diverse bond issuers. When wanting to invest into less well known or emerging companies, the investors initially had no more sophisticated means to establish the trustworthiness of debt issuers, than hearsay and letters of recommendation[23].

One possible way for the investors to deal with this high information asymmetry between themselves and the debt issuer was the enlistment of specialised investment bankers. In theory, these individuals would make their living by laying their reputation on the line, by buying and redistributing securities they deemed trustworthy[24].

Also, a specialized branch in the relatively young field of journalism appeared, when some newspaper publications in America started focussing entirely on the world of railroad business, as for example 'The American Railroad Journal' did in 1832. A former editor of this journal went on to publish an annual 'Manual of the Railroads of the United States', which focussed on reporting financial statistics and business data of American railroad companies. This author's name was Henry Varnum Poor and his son would later found the company that is now Standard & Poors Financial Services[25].

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[22] See Sylla (2001)

[23] See Sylla (2001)

[24] See Sylla (2001)

[25] See Sylla (2001)

Another direct ancestor of today's CRAs can be traced back to the so-called Credit Reporting Agencies, which also entered the stage around the middle of the century. Their business model was already closely related to that of John Moody, when he founded the first recognized CRA. Although these institutions did not assign quantified ratings to the creditworthiness of businesses, they closely analyzed the financial standing of firms and sold their findings as reports and manuals. By 1900 the larger ones of these agencies, like for example 'R. G. Dun and Company' counted tens of thousands of subscribers to their reports[26].

The situation described above is unlike anything that had been experienced in Europe so far, which can serve to explain, why no credit rating businesses had sprung up there in earlier centuries. As the American bond market was already the largest in the world at the beginning of the 20th century, and structures like a financial press and credit reporting agencies had already come up in the previous 70 years, John Moody's founding of 'Moody's Analyses Publishing Company' can be seen as a logical development[27].

The business model was quite simple. Moody's company collected data on a wide range of enterprises. Through statistical methods and estimates, a scaled rating of a company's ability to honour its financial obligations was assigned. These ratings, together with the reasoning behind it and additional information about each analysed company, were put together in thick folders, updated periodically and sold to interested parties[28]. The other well-known names of today's rating industry did appear soon after. In 1913 the 'Fitch Publishing Company', now bearing the name of 'Fitch Ratings Inc.', in 1916 the 'H.V. and H.W. Poor Co.', which merged with the 'Standard Statistics Bureau' in 1941 to form 'Standard & Poor's Financial Services LLC', started their own rating businesses[29].

During the following decades, up to the 1970s, there were few events with relevance for the future development of the industry. The rating companies made good business, but they occupied a relatively small niche market. S&P's, for example, still employed a mere 30 analysts by 1980[30].

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[26] See Sylla (2001)

[27] See Sylla (2001)

[28] See Sylla (2001)

[29] See Sylla (2001)

[30] See Sylla (2001)

The decisive economical event during the time span of 1910-1970, which also carried important implication for the future of the CRAs, was the Great Depression of the 1930s. The events of this time led to the bankruptcy of many financial institutions. In the aftermath this led to increased legislation from the side of the state. To this behalf a governmental agency was founded in 1934, the 'Securities and Exchange Commission (SEC)'. The task of this organisation up to this day is the regulation of the US security market[31]. Its actions became highly relevant for the credit rating industry in the later 20th and early 21st century.

Of immediate consequence to the CRAs was a federal prohibition of 1936 on trading in especially volatile, and thus risky, securities. In determining, which instruments fell into that category, the legislation deferred to the judgement of 'recognized rating manuals'. The essence of this regulation, which is in place up to this day, was that banks now were prohibited from investing into bonds rated below Investment Grade[32]. As a consequence, the three most important rating agencies, Moody's, S&P, and Fitch, took a much more influential role in the financial market. Before this point, banks had been free to use any source of information upon which they could base their decisions regarding portfolio composition. Now, the rating agencies had the power to decide, which assets could, and which assets could not be traded by banks, who were central players in the bond market. Basically the legislator had sourced out the judgment of bond riskiness to private companies, thus to a certain degree backing their ratings with the power of law[33] [34]. The component states of the US followed this example in the following decades, by adopting the same approach in regulating insurance companies.

The situation then stayed relatively stable up to the 70s. After the Great Depression the financial markets in the US were relatively stable, and the CRAs were well established, although they did not extend their influence to other countries. The year 1975 was to bring major change for the rating industry, however. In this year the SEC released new, portfolio – volatility based, capital requirements for securities firms. In order to determine the risk factor associated with portfolio assets, it was decided to again refer to CRA ratings. As the legislation was up to then not very specific on who was authorised to rate bonds for the purposes of regulatory frameworks, the SEC introduced the term 'Nationally Recognized Statistical Rating Organization' (NRSRO)[35].

[31] See Sylla (2001)

[32] See Sylla (2001)

[33] See White (2010)

[34] See Partnoy (2006)

[35] See Sylla (2001)

This move was intended to prevent newly founded companies to sell ratings, or firms rating their own assets through proxies. Whether through design or incidentally, by adopting this approach, the SEC put well established rating agencies, especially Moody's, S&P and Fitch, in a very strong position. Henceforth, only the ratings or NRSRO's were considered valid for fulfilling regulatory requirements. This proved to be a competitive advantage for the small number of companies who attained this status[36]. Not only did financial institutions have to have their bond portfolios rated by at least one of these agencies, their reputation among other customers was boosted as well. Interestingly, the SEC did never release specific guidelines, as to how a rating company could be elevated to the state of NRSRO[37]. Very few CRAs were recognized as NRSROs in the 80s, 90s and early 2000s. Those who managed that leap, were usually bought by one of the established three companies within a very short time. Thus, some economists argue, that the SEC had practically erected an additional barrier for market entry in the rating industry[38] [39]. This contributed to the situation, that in the 2000s, when the financial crisis started to develop, there were practically only three relevant CRAs in the world on account of their relative market shares, Moody's, S&P and Fitch.

The second revolutionary change during the 70s originated with the agencies themselves. After more than 60 years of business, they radically shifted their business model from an 'investor pays', to the 'issuer pays' concept, which is in use up to this day[40]. By this time, the CRA's ratings were important enough for the market value of a bond, that the issuers were generally willing to pay a fee for being rated. Another aspect worth of note is, that photocopy machines were becoming more and more common at this time. The knowledge, that potential customers could potentially avoid paying the agency by just borrowing and copying the current rating handbook, might also have influenced the CRAs to take this step[41]. Whatever the reason, it has been noted, that having the issuers pay for an agency to supply a rating for their bonds, represents a quite clear conflict of interest, as will be shown in chapter III of this thesis.

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[36] See Partnoy (2006)

[37] See Sylla (2001)

[38] See White (2010)

[39] See De La Dehesa (2011)

[40] See Sylla (2001)

[41] See Deb, Murphy (2009)

The 70s and 80s were also a time of substantial economical growth for the CRAs. S&Ps employed 30 analysts in 1980 and 40 in 1986. By 1995, S&Ps had an estimated 800 analysts and a total staff of about 1200 people in its employ[42]. Likewise the other two important rating agencies thrived, and the number of rated issues was extended by a similar order of magnitude. During this phase of expansion, the CRAs finally also managed to gain some measure of importance outside of the US[43].

3, The CRAs and the Financial Crisis

The final stage of credit rating history, which will be introduced to the kind reader, is the time of the recent financial crisis, starting 2007. At this time the size and influence of the Big Three CRAs was at its historical peak. In 2001, these three organizations were the only designated NRSROs in the country, as the few other agencies declared as such by the SEC, had been swiftly bought up.

In the year 2001 however, the bankruptcy and scandal surrounding the company Enron came to light. Up until five days before this huge firm went into bankruptcy, it was rated Investment Grade by the CRAs[44]. This was after Enron had used various sub-company and outsourcing contract constructions, as well as faked balance sheets, in order to hide its ever more precarious financial situation. Congressional hearings followed and the rating agencies, as well as the SEC faced harsh criticism. After coming under pressure the SEC started to appoint more NRSROs than before, with the consequence that in 2005 there were five such institutions. The SEC still had not defined any criteria upon which their decisions were based however, and although laws like the Sarbanes-Oxley Act of 2002 and the Credit Rating Agency Reform Act of 2006 were mean to remedy the situation, they did not prove effective in opening the market for new CRAs[45]. It should also be considered, that Moody's, S&P and Fitch were by then large and established companies, who had spent decades consolidating their positions. New, innovative or potentially dangerous entrants to the rating market, were simply bought by one of these old players in short order.

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[42] See Sylla (2001)

[43] See Sylla (2001)

[44] See Dittrich (2007)

[45] See White (2010)

The historical perspective provided above, explains the precarious situation at the start of the financial crisis, that almost all bond ratings in the US and also internationally, were issued by one of just three agencies. During the crisis itself, which originated in the US bond market, specifically the market for bundled home equity loans, these ratings played a significant role. These assets, known as Structure Finance Products, triggered the crisis[46]. Looking at the statistics for Moody's ratings of these products, as quoted from Benmelech, Dlugosz (2009)[47], the following picture presents itself:

◆ Downgrades in Structured Finance spiked from
  • 986 in 2006
  • to 8.109 in 2007
  • to 36.880 in 2008

◆ The average severity of downgrades was similarly affected. One step represents a downgrade by one level on the scale of the respective CRA, for example from Aaa to Aa1 on Moody's scale.
  • in 2006 structured finance bonds were downgraded by 2,5 steps on average.
  • in 2007 the average was 4,7 steps
  • in 2008 the average was 5,6 steps

◆ In the first three quarters of 2008, 11.327 (~31%) of downgrades did affect tranches, which bore the highest possible rating Aaa.

◆ Performance differences between the Big Three CRAs exist, but only on a small scale. S&P assigned somewhat higher ratings on average (by ~0,26), and accordingly conducted slightly more downgrades than Moody's and Fitch.

◆ 16.747 tranches which were issued in 2006, 2007 or 2008 were eventually downgraded by 8 steps or more, which is a significantly higher number, than the total of comparable downgrades since 1983.

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[46] See Benmelech, Dlugosz (2009)

[47] See Benmelech, Dlugosz (2009)

- The largest percentage of products which were downgraded by 8 steps or more (~19%), did initially bear the highest rating Aaa.

From these numbers, one can draw the conclusion, that the ratings assigned to Structured Finance Products prior to and during the beginning of the financial crisis, did not reliably reflect the real probability of default[48]. Consequently, all decisions taken in complying with related legislative standards, or managerial decisions based on trust in the performance of the CRAs, were biased by these inflated ratings.

The Financial Crisis Inquiry Commission (FCIC) conducted an US-government-mandated analysis of the factors leading to the crisis. The FCIC identified the flaws in rating performance, as one of the main contributing factors to the crisis. An excerpt from the conclusion paper colourfully states:

We conclude the failures of credit rating agencies were essential cogs in the wheel of financial destruction. *The three credit rating agencies were key enablers of the financial meltdown. The mortgage-related securities at the heart of the crisis could not have been marketed and sold without their seal of approval. Investors relied on them, often blindly. In some cases, they were obligated to use them, or regulatory capital standards were hinged on them. This crisis could not have happened without the rating agencies. Their ratings helped the market soar and their downgrades through 2007 and 2008 wreaked havoc across markets and firms[49].*

In essence the conclusion that the CRAs bear some degree of blame for the recent financial crisis is found in most papers on this topic. This is the main contributing factor to recent discussions about regulating these agencies and also is highly relevant to the main topic of this thesis concerning the relations between Europe and the CRAs. The reasons for the failures of the rating industry during the times of the financial crisis can broadly be put in two categories[50]. Either the agencies could not predict the huge wave of defaults that occurred and thus underestimated real risk because of flawed mathematical models. The other possibility is that the CRAs had incentives to issue inflated ratings despite having knowledge that they did not correspond to real risk.

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[48] See Benmelech, Dlugosz (2009)

[49] See FCIC (2011)

[50] See Benmelech, Dlugosz (2009)

As for the first theory, it can be said that ratings between different agencies show a high degree of correlation. Thus, if a systemic flaw exists, it would be shared by all the models currently in use. In an expert analysis from the year 2003[51], one such potential flaw was identified in the model's lack of sensitivity in regards to macroeconomic interdependencies. Basically it can be expected, that a sudden macroeconomic shock will affect all corporate borrowers, as they are dependent on a similar set of macro factors. By assuming a high degree of independence between entities, a wave of corporate defaults, as had recently occurred in Japan prior to 2003, cannot be explained or predicted in terms of the model[52].

The second explanation approach focuses on the deliberate inflation of ratings by the agencies. As all large rating agencies have switched to an 'issuer pays' business model beginning with the 1970s, one can see the potential incentive for such behaviour. The issuer of a debt instrument is interested in being rated as high as possible, in order to decrease the risk premium he will have to pay on his debt. As the issuer is free to choose, which agency or agencies he will contract to rate his probability of default, he will be naturally inclined to decide in favour of the agency with the most lenient standards. The force of market competition therefore again would push the CRAs towards assigning higher ratings in order to attract customers[53]. This problem is referred to as 'rating shopping'. It is difficult to ascertain how much impact this situation had on the ratings of structured finance products during the financial crisis. It has been noted however, that instruments rated only by a single agency had a higher risk of being downgraded, than those rated by two or three. Although not strictly conclusive this provides at least an indication that rating shopping has noticeable effects on rating accuracy[54].

In the years following the crisis, there has been less change than one might expect for the credit rating industry. There have been advances by the SEC to remedy those issues which had been most widely criticized, for example the ratings for issues which were composed by a rating agency itself. On the other hand, the worldwide credit rating market is still dominated by the same three companies, as it always has been[55].

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[51] See Van Deventer, Imai (2003)

[52] See Benmelech, Dlugosz (2009)

[53] See The Issing Committee (2009)

[54] See Benmelech, Dlugosz (2009)

[55] See White (2010)

Also, as of April 2015, the number of recognized NRSROs has increased to ten agencies[56]. Furthermore, the overall power of rating agencies has been leveraged by new legislatory initiatives released in the wake of the crisis. For example and most importantly, the BASEL standards for financial institutions, rely heavily on CRAs for categorizing assets[57].

With this background, the next sub-chapter will focus on the relation between the EU and the CRAs, providing the context and motivation for ongoing discussions about a reform of the credit rating business in Europe.

4, Relations between the Big Three and the EU

Although credit ratings hold a great measure of importance on the international financial markets and are even more important in the US economy, where they were already incorporated into legislative standards during the 20th century, the CRAs were not politically considered in the EU up until the 2000s. Rating agencies were first mentioned in directive 2003/125/EC from December 2003[58]. In this document EU members are required to ensure in their legislation, that CRAs are required to issue their statements in a clear and unmisleading manner, as well as giving thought to ensure a standard of fairness and professionalism in their recommendations. A special emphasis is given to possible conflicts of interests, which were required to be disclosed[59].

Although there was thus no formal regulation in place at the time, the European Commission subsequently asked the Committee of European Securities Regulators (CESR) for advice in formulating a more binding regulation on credit ratings. This happened in 2004, in the wake of the scandal surrounding the Parmalat company, which shared some parallels with the Enron collapse of 2001[60]. The CESR advised that no such regulation was necessary at that point.

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[56] See www.sec.gov/ocr 14.04.2015

[57] See Partnoy (2006)

[58] See Cinquegrana (2009)

[59] See 2003/125/EC (2003)

[60] See Dittrich (2007)

Also in 2004, there was a move by the International Organization of Securities Commissions (IOSCO) to introduce an element of self regulation into the credit rating industry. This took the form of the Code of Conduct Fundamentals for Credit Rating Agencies. The guidelines therein dealt with most aspects of the credit rating business and especially the deficiencies which had been revealed by scandals such as the Enron bankruptcy, therefore covering topics like conflicts of interest, transparency and internal quality controls. The large CRAs agreed on implementing this code of conduct, but the guidelines were of a very general nature and no form of sanctioning mechanism was in place. Therefore, to provide some measure of control, in Europe, the CESR agreed on a process to monitor compliance to the IOSCO code with the big CRAs. This framework contained the obligation of the agencies to issue an annual statement on its degree of compliance and to annually hold a meeting with the CESR on this topic[61].

Despite these concerns it has to be noted, that CRAs were first included in an EU regulatory framework in 2006. The context for this was the Capital Requirements Directive, implementing the Basel II standards in European legislation. Basel II requires banks to hold capital reserves on a risk-weighted assets basis. The risk associated with an asset is to be estimated by what is called an External Credit Assessment Institution (ECAI). According to the EU directive, these institutions should adhere to a certain code of conduct and were not granted any supervisory powers as such. Still, by adopting the Basel II approach through the Capital Requirements Directive, the EU had for the first time included the CRAs in a financial regulatory framework, thus granting some measure of power and regulatory license to them[62].

In the wake of the global financial crisis a new wave of initiatives to regulate the actions of CRAs arose. Internationally the G-20 summits in Washington 2008 and London 2009 were of significance. Therein the G-20 member states agreed on setting up a system of registration and supervision over CRAs. Still the main concept was that of supervised self-regulation based on a strengthened and monitored international code of conduct.

In Europe itself, there also were moves in direction of regulating the credit rating business in the direct wake of the financial crisis. In the second half of 2008 the European Commission decided to undertake legislative measures and in November issued a regulation proposal.

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[61] See Utzig (2010)

[62] See Cinquegrana (2009)

It was based on a CESR report requested earlier that year by the Commission, which recommended the IOSCO code of conduct as minimum standard for a binding legislation[63]. The regulation was adopted in 2009 as EC 1060/2009, entering force in 2010. It sets several key objectives, which CRAs operating within the EU have to adhere to. The main points especially cover enhanced supervision and transparency, as well as dealing with conflicts of interest, but in the wake of the financial crisis also aim at improving rating methodology and quality[64] [65].

As seen above, there were tentative moves in the EU to regulate the credit rating business. These grew in urgency with the financial crisis that started in 2007, not only in Europe, but globally. In the EU however, there was a further chain of events in which the CRAs were involved, which fuelled the ongoing and following debates about how the rating business should be regulated or even restructured. This was the European sovereign debt crisis, which started in 2009 and as of 2014 still carries into the present.

After a general election in Greece in 2009 the country's government corrected its forecast for this year's annual budget deficit upwards from 6% to 12,7% of the GDP[66]. Some other Euro countries like Ireland and Spain also noted sharply rising debt rates during this time. This raised concerns on the overall debt, liquidity and economy of some of the member states of the Eurozone. Although the overall indebtedness of the EU actually grew at a smaller pace than in the USA, it was distributed very unevenly across the member states. The Stability and Growth Pact originally had fixed the maximum annual budget deficit of Eurozone member states at 3% GDP and the overall public debt at 60% GDP, but some countries had already exceeded these limits by far, even prior to the crisis. For example, Italy and Greece had public debt ratios well above 90% since the 90s, whereas countries like Germany were comparatively stable at a much lower level of sovereign debt[67]. In addition to the factor that these very unequal conditions had already been established in the Eurozone by the mid 2000s, the global financial crisis had a noticeably asymmetric impact on the EU members[68].

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[63] See Utzig (2010)

[64] See Cinquegrana (2009)

[65] See EC 1060/2009 (2009)

[66] See Lane (2012)

[67] See Lane (2012)

[68] See Lane (2012)

In Ireland and Spain, the construction sector, which was hit especially hard, had experienced a strong growth over the previous years, leading to an economic shock when it now declined sharply. Ireland's economy was also partly fuelled by a strong banking sector, which suffered a setback, when the debt markets shrunk in the wake of the crisis. When Greece now revised its outlook for the 2009 deficit, the precarious level of sovereign debt in a handful of countries became a political and economical cause for concern[69]. Despite the affected nations sharing a common currency, the interest rates for sovereign bonds of these countries began to rise sharply, worsening the situation for these states and also creating a spillover effect on previously stable EU countries[70].

The course of the crisis in terms of yield margins on ten year sovereign bonds is illustrated in the figure below:
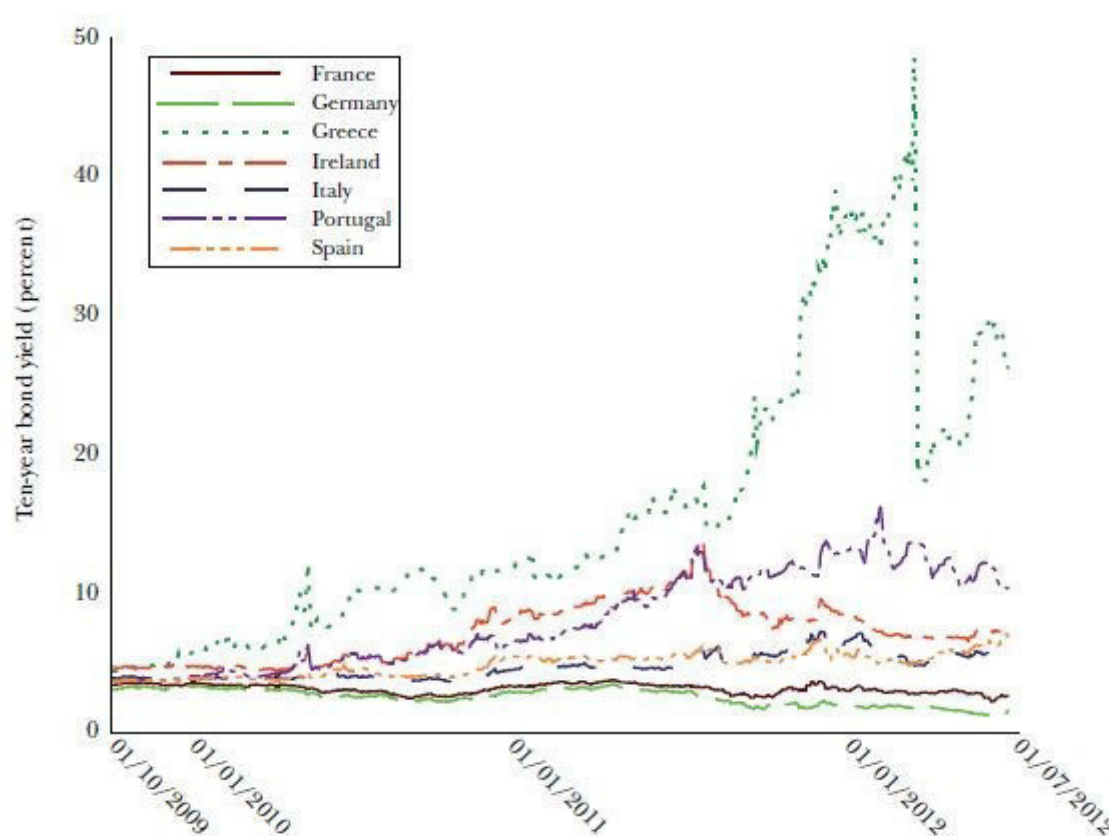
Figure 2 - Ten Year Sovereign Bond Yields[71]

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[69] See Lane (2012)

[70] See Arezki, Candelon, Sy (2011)

[71] See Lane (2012)

As can be seen, some countries, most of all Greece, came under strong pressure from the financial markets, beginning with the end of 2009. Three countries received financial help from the EU during 2010 and 2011, Greece, Ireland and Portugal. The pre-existing European Stability Mechanism (ESM) was adapted to provide funding for Euro countries facing a debt crisis. The potential for an Euro country defaulting, had significant effect on the European financial markets and affected even the stronger economies within the Eurozone[72]. This also had significant consequences in the political dimension, especially for those weaker countries like Greece, who now had to push severe austerity programs in order to stabilize their economies.

The events in Europe during the sovereign debt crisis were of course closely regarded by the CRAs, who also rate the bond instruments that are emitted by countries, in terms of perceived probability of default. This resulted in many rating changes, often quite significant downgrades in the critical period between 2009 and 2012. In December 2009 Greece's rating level was downgraded by all three major rating agnencies[73]. Very soon afterwards, in April 2010, Standard & Poor's finally downgraded Greece to ratings below investment grade and to 'junk' status, a move which was followed by Fitch and Moody's somewhat later. Ireland, Portugal and Spain also were downgraded significantly in the timeframe between 2010 and 2012. In the beginning of 2012 Standard & Poor's released another wave of downgrades, cutting the ratings of, amongst others, Spain and Italy. Also the relatively stable countries of France and Austria lost their top ratings of AAA.

In the course of the sovereign debt crisis many of these rating decisions were subjected to severe criticism by some politicians as well as economists. Prominent critics of the CRA's actions were, among others, Mario Draghi, the president of the European Central Bank (ECB) and Mervyn A. King, the governor of the bank of England[74]. Also many governments affected directly or indirectly by the rating changes and institutions like the European Commission and the OECD expressed their misgivings[75].

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[72] See De Santis (2012)

[73] See Arezki, Candelon, Sy (2011)

[74] See New York Times, 17th January 2012

[75] See http://www.eubusiness.com/news-eu/oecd-eurozone-debt.b5x, 7th July 2011

The main points of concern with the conduct of the rating firms were similar to those expressed with their performance during the preceding financial crisis. A short overview of these issues will be presented here, with the intention of providing the reader with the necessary background to understand the reasons for the topic of regulating the CRAs to become a matter of priority in European politics. A more detailed analysis of the CRA's shortcomings and possible remedies for the situation will then be presented in the following chapter.

First off, frequent, short-noticed and severe downgrades created the impression, that the ratings reacted to the movements of the market, thus being retrospective instead of prospective[76]. The quality and objectivity of the rating models was questioned in regards to its ability to take the close economical and political relations between the members of the Eurozone into account[77]. The exact models behind the rating systems of the companies are not known and the rating process has been criticized as intransparent, which exacerbates the doubts about model quality. Furthermore especially the impacts of rating changes on the financial markets were a cause for concern. Severe downgrades as in the case of Greece served to increase the risk premiums being paid on these country's governmental bonds, further complicating their financial situation. Also downgrading the sovereign bonds of a nation, especially if the rating change takes it to 'junk' status, can have a significant psychological effect on potential investors[78]. Even more directly, credit ratings have been incorporated in regulatory standards, in Europe through the BASEL frameworks for financial institutions. This makes lowly graded assets unattractive for banks, thus making it more difficult for countries with debt problems to retain liquidity[79].

These problems, which were perceived with the actions of the CRAs, caused responses with the policy makers and financial institutions in the EU. Apart from new regulations issued by the European Commission, the course of the ECB is worth of note at this place. Before the crisis, the ECB had strict quality requirements on assets eligible as collateral, as well as bonds. These were based on credit ratings, for example there was a BBB – floor for accepting sovereign debt[80].

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[76] See Eijfinger, (2011)

[77] See De La Dehesa (2011)

[78] See De La Dehesa (2011)

[79] See Sibert (2011)

[80] See Arezki, Candelon, Sy (2011)

Over time, and starting in 2010 after Greece had been downgraded to 'junk' status by the first big CRA, the ECB relaxed their standards in order to be more independent from the rating companies and be able to directly support that country by buying its bonds. More measures followed as needed, for example with Cyprus, until in 2013 the rating limits for sovereign bonds of Eurozone members under official financial support were suspended altogether[81]. In order to deal with the effects of the crisis on the domestic economy by supporting households and non-financial corporations, the ECB also extended the range of assets accepted as collateral for these credits[82].

Meanwhile the European Parliament and Commission took the legislative path and in 2013 replaced the regulation EC 1060 which still dated from the year 2009. The stated goal was to address the following key issues:

◆ The reliance on credit ratings was to be reduced.
   To this end, existing and newly drafted EU laws were to be critically reviewed in respect to references to credit ratings by external agencies, and such references adapted or removed as deemed appropriate.

◆ Transparency of sovereign ratings was to be improved and potential negative impact mitigated. Therefore, rating agencies now may only release unsolicited sovereign state ratings on three dates per year, all of which fall on a Friday. All ratings and outlook announcements have to take place outside the business hours of the financial market. Detailed reports, explaining the model basis underlying a rating change have to be published together with each announcement.

◆ CRAs were to be made accountable for their actions by law.
   The regulation contains a provision for civil liability of rating agencies, if they intentionally or through gross negligence, violate the legislation and thus cause financial damage to an investor or issuer.

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[81] See ECB2013/4

[82] See ECB2012/18

◆ The impact of potential conflicts of interest should be mitigated.

The package to achieve this aim includes various disclosure requirements for cases where shareholderships and financial interest might provide a counter-incentive to objective ratings. Apart from that, a company emitting securities is to switch the rating agency for their assets every four years.

This regulation entered force in 2013 as Regulation (EU) No 462/2013 and as of January 2015 still remains in force[83].

This chapter has taken us through a general and historical overview of the credit rating business. A special emphasis was placed on the time span covering the 2000s up to the present and including the CRAs conduct during the Global Financial Crisis and the European Sovereign Debt Crisis. This led to a description of the political context in the European Union and legislation of CRAs in the European theatre.

The next chapter will illustrate what points presently make an alternative model and more drastic changes in the credit rating industry an appealing concept for European policy makers. The root causes for dissatisfaction with the Big Three companies will be examined and different solution concepts analyzed and discussed.

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[83] See Regulation (EU) No 462/2013

III, New Approaches for Credit Rating

1, Causes for suboptimal Rating Quality

The recent years of financial crisis have served to reveal several key weaknesses in the current credit rating system. In order to find and weigh possible alternatives and also to define goals to be met by an European domestic rating service, the main points of concern with the status quo have to be identified. This sub-chapter will go into detail on the CRA's shortcomings and the reasons behind them, therefore constituting the problem statement against which any possible solution must be measured.

The first issue, which will be discussed and assessed in some detail, is the factor of rating model quality itself. Although it has not received as much public attention as, for example the implication of 'rating shopping', various sources claim that the mathematical models behind the agency's rating systems might be inherently faulted[84].

A commonly used approach from the 90s to the mid 2000s was the mixed-binomial model. Although this model is sensitive to correlations within pools of collaterals and within collateral sectors, it does not provide a way to allow for the occurrence of macroeconomic shocks. Even corporate borrowers, which are from different sectors and independent under the assumptions of this model, are dependent on a set of macroeconomic factors. In times of a crisis this can cause spikes of corporate default numbers, which are not covered by the binomial model and hence cannot be predicted[85].

More recently, the big CRAs have started to introduce other techniques as basis for their rating models. For example Moody's made a transition from the binomial approach to a Gaussian copula in 2004 and used this new model in the timeframe of the financial crisis[86], whereas Fitch's nowadays uses a methodology based on Monte Carlo simulations.

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[84] See Benmelech, Dlugosz (2009)

[85] See van Deventer, Imai (2003)

[86] See Cifuentes (2008)

Although, according to Moody's investor service, from September 26th 2005, to better deal with correlation effects, empirical evidence from the financial crisis does not show a markedly superior performance of the new methodology. Cifuentes (2008) even suggests that the assumptions underlying this new model might be less accurate than with the old approach[87].

In fact, the differences in ratings assigned by the Big Three CRAs seem to be very minor, however – an observation which implies its very own problems. An empirical analysis on the data of structured finance products during the crisis, conducted by Benmelech and Dlugosz (2009), shows a high degree of correlation, with correlation coefficient values above 0.95 between the ratings of the different agencies[88]. This is seen as a sign, that although slight differences exist between the models, they are very similar and might thus be prone to arrive at the same flawed results due to model errors, under the same circumstances.

A related topic is the possibility, that the design characteristics of a rating model might be exploited by the debt issuers. Although the exact calculations used by the different rating companies can not be assumed to be known by the issuing institutions, the CRAs provided so-called 'customer end tools' to their clients. These allowed to pre-run the checks of the agency and provide an estimation of the expected portfolio performance in a rating test[89]. By using this information, issuers are potentially able to empirically find ways to alter their portfolio composition in a way that caters to certain aspects of the credit risk model, thus attaining a higher rating without necessarily being less likely to default. This is not necessarily feasible for corporate bonds in general, but might have an impact in the field of structured finance, which was highly relevant in the global financial crisis of 2007 to 2008[90].

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[87] See Cifuentes (2008)

[88] See Benmelech, Dlugosz (2009)

[89] See The Issing Committee (2009)

[90] See The Issing Committee (2009)

The second problem area to be discussed in this thesis, is much more controversial and often constitutes the key issue of any debate about the performance, role or regulation of CRAs. It might be summarized by the question: Even if rating agencies do possess all the information necessary to provide neutral ratings of high quality, would they act on this information in an unbiased way, or do conflicts of interest provide sufficient counter-incentive and distort the ratings?

The most striking aspect about the rating industry in this respect is the much debated issuer-pays model of remuneration. As explained earlier in this work, the business model used by CRAs since the 1970s, is based on the principle, that an issuer of a debt instrument pays for an agency to evaluate it and assign a rating. The issuer can always be assumed to be interested in obtaining a rating that is as high as possible, in order to keep the risk premium and thus the absolute rate of interest on the instrument as low as possible. A CRA's traditional market role is to reduce the information asymmetry between buyers of debt, who are interested in information about the true probability of default, and issuers of debt, who are disinclined to release any information that might indicate a higher probability of default[91]. Therefore, with the issuer-pays model, entities are paying the CRAs to provide information to the market, which they themselves often do not want to be objective. That this problem exists, might diminish rating quality and possible open the door to corruption, is agreed on by many scientific sources[92] [93] [94] [95] [96].

A striking way in which this conflict of interest might impact the ratings is the practice of 'rating shopping', or effectively searching out that agency with the most lenient standards for contracting. This creates competitive pressure for a CRA to lower its standards in order to maximise profit. Furthermore the fee for rating an instrument is proportional to its value. As highly rated instruments are more valuable than lower rated ones, this also leads to increased revenue with higher ratings[97].

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[91] See Dittrich (2007)

[92] See De La Dehesa (2011)

[93] See Eijffinger (2011)

[94] See Sibert (2011)

[95] See Utzig (2010)

[96] See Partnoy (2006)

[97] See Sibert (2011)

A closely related issue further tying CRAs and their customers together is the marketing of ancillary services by the rating companies. All three big agencies offer consulting services in the area of risk management. Therefore they sell advisory activities to potential customers, often concerning credit risk potential of assets, which in turn might also be rated by them[98]. Similar services, which blur the line between ancillary activities and the nominally independent main business of credit rating itself even further, fall in the category of pre-rating assessments and scenarios. This means, that the CRA will, against a fee, give an estimation not only of the current rating performance of a company, but also provide an outlook, how a potential future business case, such as a organizational change or merger might affect these ratings[99].

The potential for conflicts of interest that can arise through these activities is rather obvious. On the one hand, customers might feel inclined to purchase additional services from the company that is rating their issues, in the hope of compelling more favourable results, or fear an adverse effect if they do not purchase or do cancel these services[100]. On the other hand, the CRA might indeed be inclined to advise their customer on how a better rating could be obtained, in the course of consulting activities. In the case of scenario pre-rating, they will be almost compelled to enact the promised rating changes, when a business case is carried out[101].

The issues explained above show that there are indeed points of mutual financial interest between debt issuers and CRAs. These factors become even more influential if one takes the potential long-term perspective of a business relationship into account. It is not unusual for a company to contract the same rating agency over many consecutive years[102]. As long as the desired ratings are obtained, the customer has not much to gain by switching over to a different one. The agency on the other hand can expect the customer to yield profit over many years to come, as long as they can keep him on contract. As can be readily seen, these dynamics provide strong incentives for a CRA to give ratings of non-optimum quality from an information and market perspective.

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[98] See Deb, Murphy (2009)

[99] See Partnoy (2006)

[100] See Sibert (2011)

[101] See Partnoy (2006)

[102] See Deb, Murphy (2009)

Even though the CRAs claim, that these factors have no influence on rating decisions and are being managed by internal controls, there have been famous examples to the contrary. Although these are extreme cases and cannot be assumed to be the average case, they do illustrate the potential consequences of conflicts of interest on rating quality.

The first such case study is the Enron scandal of 2001. Although in this case, the accounting firm Arthur Andersen, which was tasked with auditing the company, bore the blunt of the blame, the Big Three also faced harsh criticism in the aftermath. Enron either successfully concealed its financial problems from the CRAs, or the analysts deliberately overlooked them right until the end. This led to Enron's debt issues being rated investment grade by the big rating agencies until mere days before the final default of the multi-billion Dollar company, which was the largest bankruptcy case in the US until that date[103]. In 2002 similar events occurred with the company WorldCom. When it defaulted in July 2002, after its board members had faked financial reporting in order to keep stock prices up, it relieved Enron of the dubious honour of being the record bankruptcy case in the US. Like with Enron, the credit ratings of the large agencies failed to reflect the true status of creditworthiness until it was too late for most investors. WorldCom was only downgraded to 'junk' status in May 2002, about one month before default. This case was especially unpleasant for Moody's, as the chairman of this agency was also a board member of WorldCom until the end of 2001, a fact that cast serious doubt on rating objectivity, after it became obvious that the rating quality was dubious in respect to WorldCom's debt[104].

As mentioned, these cases might not be fully representative. However, the rating performance in the global financial crisis also was often lacking, as explained in Chapter II of this thesis. Although the exact reasons for these shortcomings are difficult to ascertain, at least circumstantial evidence exists, that conflicts of interests played their part[105]. This has also been a motivation for increased regulation of CRAs in recent years and is a main reason for the ongoing discussions about a reform of the rating business in Europe.

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[103] See Dittrich (2007)

[104] See Sibert (2011)

[105] See Benmelech, Dlugosz (2009)

The fourth and final main cause for deteriorating rating quality, along with the issuer-pays model, ancillary services and close long-term relationships between CRAs and customers, is the potential to abuse ratings as a tool of power. As S&P's, Moody's and to some degree Fitch's practically enjoy an oligopoly over the rating industry, a rating announcement by one of these companies carries considerable weight. Here it is important to remember, that not only the opinion of market participants is a factor, but the CRAs also hold a certain regulatory function within important legislative frameworks[106]. This puts them in a position, where they might have the leverage to issue ratings to extort clients.

The basis for worries and critique on this issue is found in the practice of unsolicited ratings. Although rating agencies are most often directly contracted by a customer company, granted insight into its operations, and conducts an analysis against a fee, this is not always the case. Since the 90s, the practice of unsolicited ratings has come up with the big CRAs. These are not requested by, or paid for, by the affected debt issuer, based purely upon publicly available information and denoted as pure statements of opinion by the agencies themselves. An early example, that also quite clearly shows the potential for abuse that is inherent in such actions, is the Jefferson County school district in Colorado, USA. In 1993 the district decided to issue new bonds and contracted S&P's to rate them, instead of Moody's, which had rated previous issues. In the beginning the bonds sold well, but soon after initial pricing Moody's released an unsolicited 'negative outlook' statement. This forced the school district to lower the price of the instruments and in turn incur a financial loss[107] [108]. Another example that has aroused the suspicion of extortion is the case of the German insurance company Hannover Re. Since 1998 Moody's released unsolicited ratings on the company. In complete contrast to the contracted ratings of S&P's and A.M. Best, another smaller rating agency, the ratings by Moody's declined steadily, even going as far as rating Hannover Re to 'junk' for some time in 2003[109].

Beginning with the Jefferson school district, several lawsuits against CRAs on the issue of unsolicited ratings have occurred in the USA.

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[106] See Partnoy (2006)

[107] See Partnoy (2006)

[108] See Sibert (2011)

[109] See Sibert (2011)

In this first judicial case as well as later on in the USA, the rating agencies have claimed, that unsolicited ratings merely reflected an 'opinion', which is a protected right under the First Amendment of the United State's Constitution, guaranteeing free speech[110]. This has been accepted by the American judicial system so far and until recently, the topic of judicial liability for unsolicited ratings has not come up. A notable exception, which might indicate a new trend towards accountability, is the European Regulation No 462/2013, which has been discussed earlier in this text.

As was thoroughly discussed on the previous pages, there are strong incentives for a CRA to assign ratings based on business strategy, rather than objective information. Counteracting this, and maintained as an argument by supporters of the status quo, is the concept of self regulation through market reputation. The basic idea is, that the success of a rating agency were to depend on the quality of it's ratings, which could be assessed by correlating the rating scores ex-post to the occurred defaults of the rated products over time[111]. As there is no way to test the quality of ratings from a given agency ex-ante and there is no physical product, previous experience with ratings from this agency is, in theory, the only reason for the market to place trust in it. Therefore, a CRAs survival would be directly dependent on the accuracy of its credit risk estimations. In theory, a single much publicized failure in this respect could be enough to threaten a rating company's existence[112]. Following this line of argumentation, it would simply be rationally too risky for a CRA to try to increase its profits by engaging in dubious or even illicit business practices[113].

There are arguments against the reliability of this incentive to self-regulation, however. First off, in the field of highly valued bonds, which are especially profitable to a CRA, the probability of default is rather low, making an empirical verification of rating quality difficult, due to the small quantity of defaults. Also, the reputational mechanism theory does not cover the problem, that managers in a CRA might be willing to sacrifice long-term rating quality for their own short-term profit, for example due to compensation systems within the company[114].

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[110] See Partnoy (2006)

[111] See Dittrich (2007)

[112] See Dittrich (2007)

[113] See Dittrich (2007)

[114] See The Issing Committee (2009)

Furthermore, even in the case that a large agency loses the trust of the market to some degree, its ratings would still carry weight through the regulatory function they fulfil in legislation. This mitigates the impact of reputational damage for CRAs by providing a persistent source of influence and economic rent[115]. There also is no conclusive empirical evidence to support the theory of an effective reputation mechanism. Indeed, even after the global financial crisis, where the CRAs failed and so contributed to the catastrophy[116], the agencies were heavily criticized but were able to keep their position of power. To conclude the critique on the concept of reputation-based self regulation, the work of Mathis, McAndrews and Rochet (2009) is to be mentioned here. In their work they constructed a market model in order to research the effectiveness of this mechanism, reaching the conclusion that it offers no sufficient deterrent to opportunistic behaviour[117].

This sub-chapter has provided an insight into the inherent problems of today's rating industry. Problems with model quality as well as the various potentials for conflicts of interest have been pointed out. The reputational mechanism has been concluded to be insufficient to guarantee unbiased ratings of high quality. After this view on issues negatively affecting rating quality, the next sub-chapter will deal with the potential impact of bad ratings.

2, Consequences of suboptimal Rating Quality

Credit ratings have become an integral part of the financial markets in the last decades. They are used in legislation, internal frameworks of many institutions and are often an important factor in investment decisions. If one takes into account, that the quality of ratings might be flawed, this can have severe consequences.

The first problem complex arises from the aforementioned practice of granting regulatory license to CRAs, for example by the designation of NRSROs in the USA, or for determining capital requirements in the Basel accords. This fact can lend immense weight to a rating decision, as will now be explained.

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[115] See Partnoy (2006)

[116] See Benmelech, Dlugosz (2009)

[117] See Mathis, McAndrews, Rochet (2009)

In fact one just has to take the example, of a downgrade that takes a financial instrument below a certain threshold. Funds or banks that are bound by restrictions concerning the rating of issues in their portfolio, might be forced or at least pressured to sell said instrument. This can lead to a massed sale of the downgraded item, in turn causing a sudden and sharp decline in its price. Therefore the rating action can cause serious problems for the issuer and possibly lead to a default, as well as effectively increasing market volatility. Also the regulatory function of CRAs, which gives their ratings a quasi-official seal, might facilitate overconfidence in their accuracy[118].

The overall rather high level of confidence which is placed in credit ratings by market participants can also lead to harmful dynamics. Overt reliance can cause a deterioration of monitoring in the debt buying institutions. Rechecking the creditworthiness of customers can be a serious drain on resources, making trust in a CRA also the cheaper option, at least in the short term. Thus, especially in the case of top rated issues, it can be attractive to omit redundant double checking of credit ratings by the own organization[119]. Furthermore, it is very difficult to reach a sound estimate of a party's probability of default. Especially in the field of structured finance, many products are extremely complex and difficult to understand. This induces a degree of dependency of investors on CRAs, who are assumed to have the information and expertise to provide reliable analyses[120].

The effects and dynamics that can originate from this situation have been termed 'cliff effect' and 'herd behaviour' by various authors[121] [122] [123]. The term 'cliff effect' means, that a single sudden, perhaps drastic change in rating can have disproportional consequences on the market[124]. This is especially true if the rating action takes an issue down below investment grade, or below a risk level required in financial regulation. The 'herd behaviour' that can also be triggered by a downgrade in times of high insecurity on the market, can lead to a sudden, not necessarily reasonable, loss of trust in a company, or even country. Therefore rating changes at crucial moments can indeed become self fulfilling prophecies, with the financial situation of an issuer deteriorating, simply because the market participants believe it to be in financial trouble[125].

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[118] See Whelan (2011)

[119] See Whelan (2011)

[120] See Partnoy (2006)

[121] See Whelan (2011)

[122] See Eijfffinger (2011)

[123] See De La Dehesa (2011)

[124] See Eijfffinger (2011)

[125] See De La Dehesa (2011)

The implications of these dynamics, results in the often voiced criticism, that CRAs can have a destabilizing influence and promote procyclicality on the financial markets. This is especially true when they fail in delivering timely and accurate information, as happened for example during the financial crisis of 2007-2008. Here the true risk of issues was either not known or not revealed by the agencies, until it was too late to provide investors with enough time to react. This leads to the situation, that the appropriate rating downgrades might only occur at a point, where the information that an issuer might be facing default is already known to the market. In this case, the downgrade, which tends to be a severe one taking the affected instruments down by several notches, will contribute no new information to the market, but might still induce 'cliff effects' and 'herd behaviour' as explained above[126].

Summarized, one possible problem with inaccurate ratings is, that they destabilize the market, by providing overly optimistic assessments in economically favourable times. When the economic curve has gone past its apex, sudden downgrades will in turn contribute to an increased severity of a crisis. Worthy of note at this place is a study by Ferri, Liu and Stiglitz, who found evidence of exactly this phenomenon for the East Asian crisis of the late 90s, almost a decade before the financial crisis of 2007-2008[127].

The next set of problems is associated with the possibility, that the market effects of sovereign rating changes may spill over into countries, whose own credit rating in fact remained stable. This effect especially causes concern in the European Union, due to the close ties, common currency and highly divergent sovereign credit risk spreads between its member states. Furthermore experience from the European Sovereign Debt Crisis showed, that financial problems in even an economically rather small country, can have serious impact on the financial markets and affect the whole Eurozone in a noticeable manner[128]. As sovereign credit rating announcements can have significant consequences themselves, the scenario that such an announcement itself might not only influence the spreads of the targeted country, but also have a spillover effect, has to be considered. This term means, that the impact of rating changes might extend from the directly affected entity onto others, which were not re-evaluated by the CRAs.

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[126] See Eijffinger (2011)

[127] See Ferri, Liu, Stiglitz (1999)

[128] See Lane (2012)

Indeed, there are various ways how this spillover across countries and markets could conceivably take place. The first factor is, that the sovereign debt of the affected country might be held by various financial institutions that are seated abroad. Also, foreign banks might directly hold claims on banks located in the downgraded state. These are significant issues in the tightly interwoven financial markets of Europe[129]. As a rating downgrade will affect the profitability of the targeted issue, this will impact the balance sheets of financial institutions in the whole theatre, depending on portfolio composition and irrespectively of geographical distance[130].

The second important point which facilitates spillover and has to be kept in mind, is again the function of debt ratings in regulatory and institutional credit risk frameworks[131]. Through the Basel agreements, all banks holding debt of a country will be affected. The ECB itself also has a threshold on the quality of bonds it will buy. As well as that, under the Eurosystem Credit Assessment Framework (ECAF), there is a rating limit on issues that are accepted by the ECB as collateral in exchange for funding of financial institutions. Also typical insurance and collateral rules in derivate contracts depend on CRA rating levels. A sovereign downgrade can indeed trigger collateral calls in various ongoing trades involving issues of the country. Investment policies of various institutional investors, for example pension funds, also frequently refer to credit ratings, making these portfolios especially sensitive to rating changes[132].

There are scientific studies on this topic, which indeed illustrate the spillover effect using econometric methodologies on the sample of the European Sovereign Debt Crisis. As the systemic consequences of sovereign credit ratings are a main point of concern and will be a focus for discussing and weighting alternatives to the current modus operandi of CRAs, the findings of two important researches on the topic will be summarized here.

Arezki, Candelon and Sy (2011) found distinct evidence of spillover effects in the timeframe of 2007-2010. The severity of the phenomenon was found to be dependent on the type of rating announcement, the targeted country and the originating agency[133].

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[129] See Arezki, Candelon, Sy (2011)

[130] See Arezki, Candelon, Sy (2011)

[131] See De Santis (2012)

[132] See Arezki, Candelon, Sy (2011)

[133] See Arezki, Candelon, Sy (2011)

Actual downgrades led to much more pronounced consequences than revisions of outlook, which can be explained by taking into account, that credit ratings are used in regulatory frameworks as mentioned above. Although central European countries were found to be sensitive to rating announcements in the periphery of Europe, the effect was significantly stronger when countries of the Eurozone were the subject of downgrades. Finally, the results showed a weaker effect when the rating originated with Fitch's, as compared to S&P's or Moody's, which might be a consequence of the much greater market share enjoyed by the latter two companies. The most striking example for spillover was found with the country of Greece, although test results for the ratings of Ireland were also positive. These were measured against countries, which were not unduly troubled by sovereign debt, like the Netherlands, Finland and Austria. It was concluded, that especially downgrades to speculative grade, had systemic effects on the European economy that could not be scientifically explained by the other factors of the crisis[134].

Underlining and summarizing these conclusions, the graphics on the next page show sovereign bond spreads of selected Eurozone countries, related to rating announcements from the Big Three CRAs.

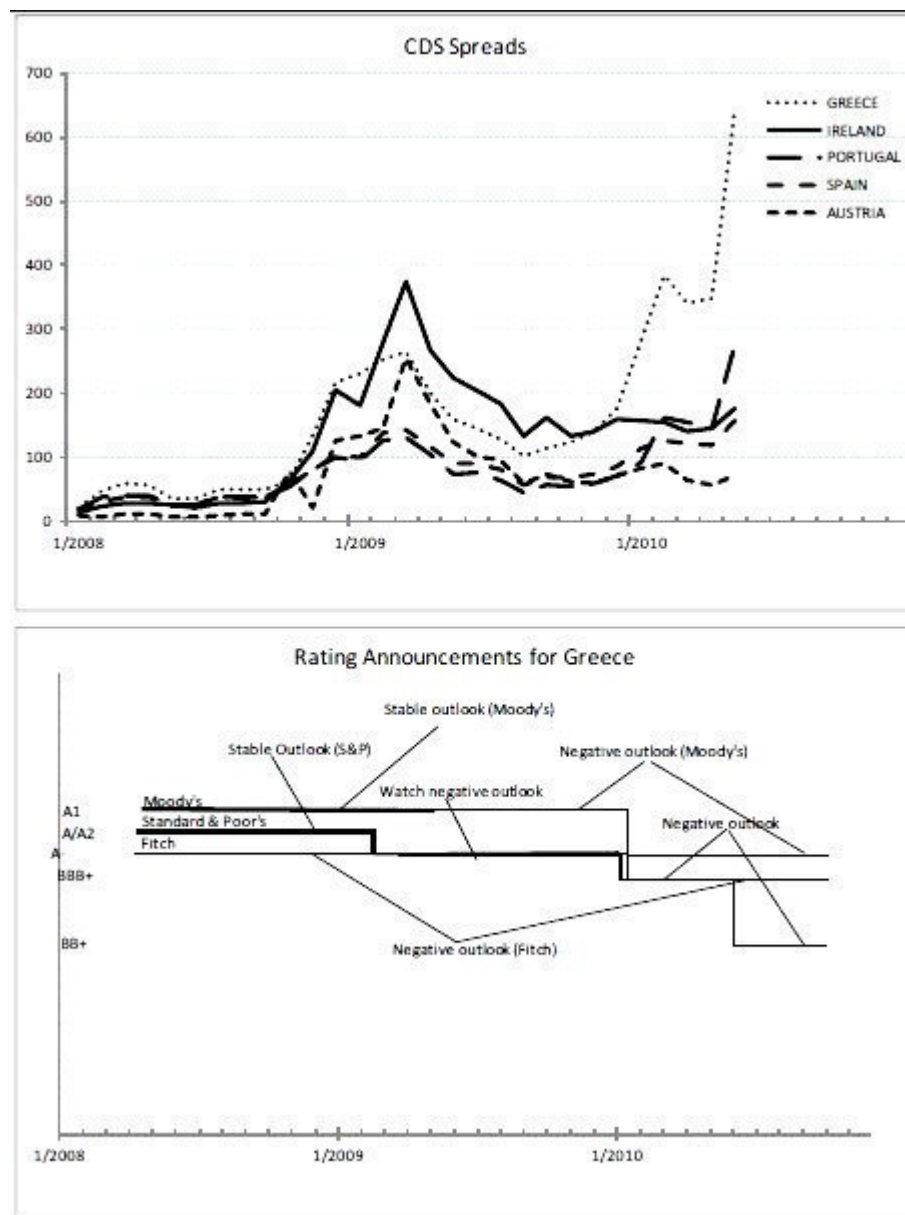---

[134] See Arezki, Candelon, Sy (2011)

Figure 3 - CDS spreads in the Eurozone and Rating Announcements for Greece[135]

This gives an overview of what was discovered by the authors, using a vector autoregression analysis, namely a connection between downgrades and CDS spreads in the Eurozone.

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[135] See Arezki, Candelon, Sy (2011)

The second important study exploring the consequences of sovereign rating changes, by De Santis, shows similar results. By applying an empirical analysis technique, contagion effects at a significant level were discovered, following rating changes in sovereign bonds. This holds true even for downgrades by only one notch, of Greece, Ireland or Portugal, although the effect is by far strongest for Greece. Furthermore, the spillover effect was discovered to have much more impact on the weaker economies within the Eurozone, like Ireland, Portugal and Spain, with Italy, Belgium and France also being noticeably affected[136]. This at least implies the possibility of especially harmful market dynamics, when downgrades in financially weak or indebted Euro countries potentially trigger a rise of spreads and further downgrades amongst their number.

The following figures show the effect of an unexpected one-notch downgrade of Greece's sovereign debt on the spreads of the 10 year sovereign debt of other Eurozone members.
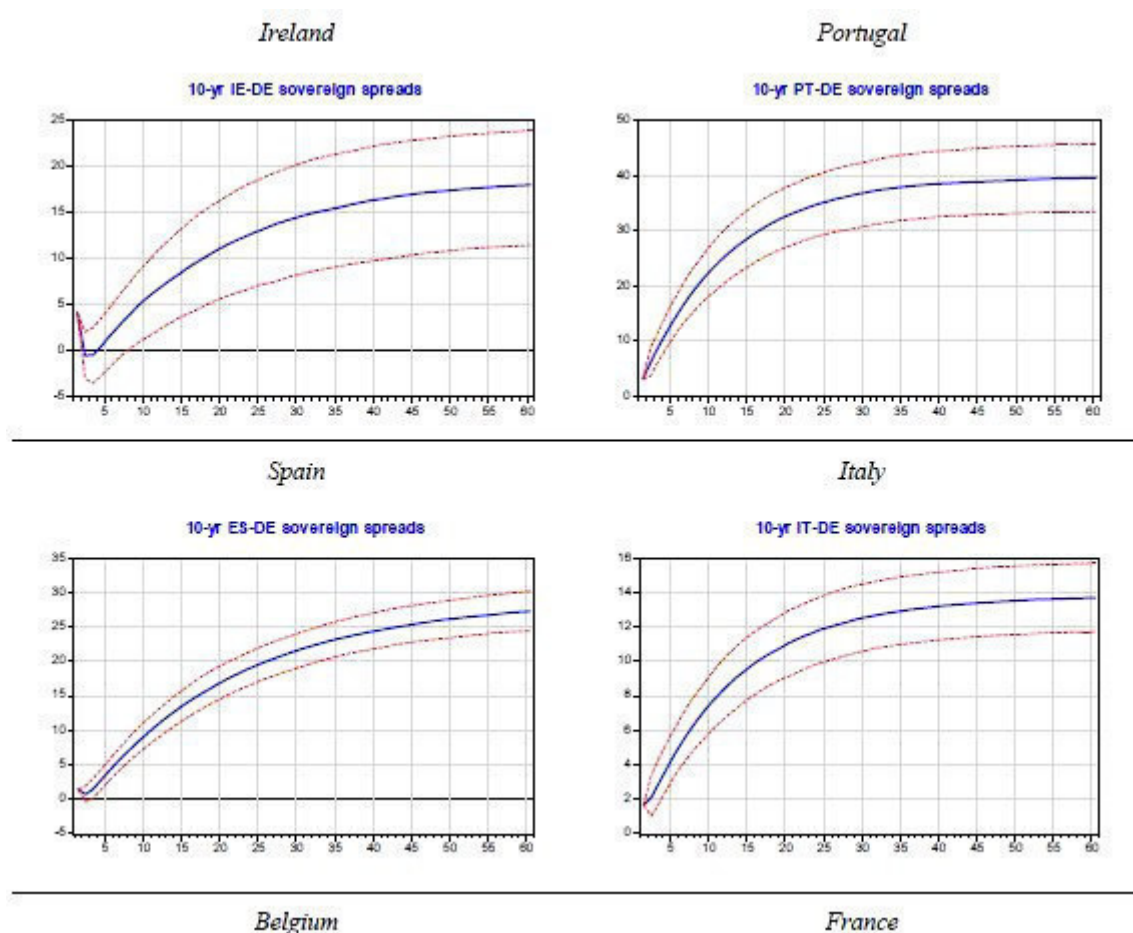

Figure 4 – 60 day spillover on Irish, Portugese, Spanish and Italian 10 year sovereign debt, after rating downgrade of Greece[137]

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[136] See De Santis (2012)
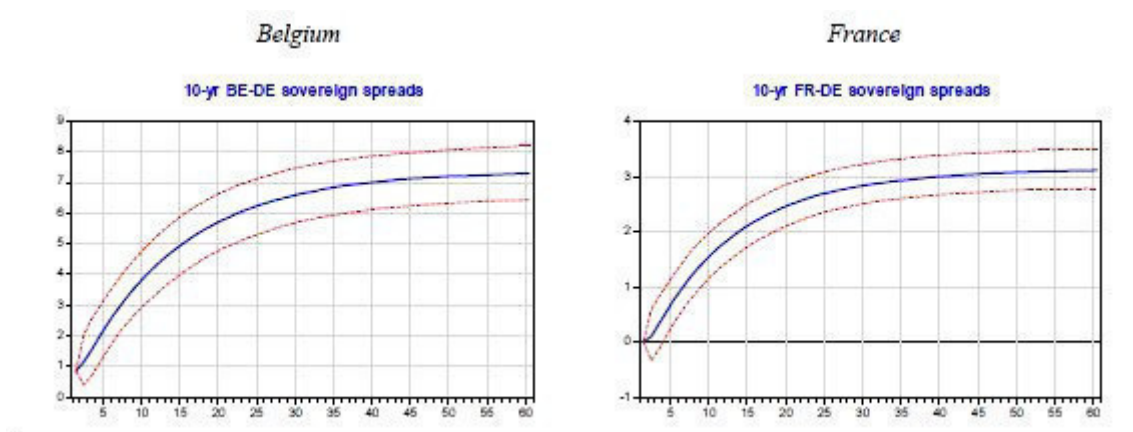
[137] See De Santis (2012)

Figure 5 – 60 day spillover on Belgian and French 10 year sovereign debt, after rating downgrade of Greece[138]

As can be seen, the econometric research of De Santis also yields the result that a sovereign credit rating can have a noticeable spillover effect. The tendency, that the impact on weaker countries is stronger, than on more stable ones can also be seen in the figures above.

In conclusion, it can be said that ratings have a quite large influence on the financial markets. If the rating quality is insufficient, this therefore can have various negative consequences, such as cliff effects, herd behaviour, spillover and procyclicality.

3, Objectives of an alternate Credit Rating System

With the context provided in the preceding sub-chapters it is now possible to define the goals that should be met by introducing alternate structural approaches for the credit rating industry, or by the foundation of a domestic European CRA. There are two basic ways in which an improvement over the current situation can be achieved:

Either the average quality of ratings is raised, or the potential impacts of bad ratings is mitigated.

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[138] See De Santis (2012)

The reasons for a potential lack of rating quality and thus the opportunities to raise that standard, can be summarized from the preceding pages of this work as:

- Flawed mathematical methodologies in rating models, caused for example by false assumptions on the market and the interconnections between market participants. Even though the models may usually deliver sound results, this might not be the case anymore when faced with complex systemic factors during times of crisis.

- Debt issuers, with whom the rating agencies necessarily have to cooperate during the rating process, are economically interested in obtaining as favourable ratings as possible. Thus, there is the potential for misleading the rating agencies by withholding information, or by exploiting gaps in the CRA's credit risk models.

- Rating shopping by companies and competitive pressure between the CRAs can lead to lowered rating standards, as giving more favourable ratings might be seen as a way to attract more customers.

- Conflicts of interest providing an incentive for issuing biased ratings, as the profit generated by cooperating with debt issuers may exceed the potential harmful consequences of such a behaviour on a CRA's reputation.

- Unsolicited ratings could be used as an instrument of power by rating agencies, in order to put pressure on potential clients. Therefore, a rating could be abused for strategic reasons and in this case won't be an accurate representation of the true probability of default.

The following factors, also discussed in the previous parts of the thesis, lead to a potentially severe impact of credit ratings on the economy, especially in cases where the rating quality is lacking and the ratings did deviate from the real probability of default on average:

- CRAs enjoy a certain degree of regulatory license in financial market frameworks. Therefore, ratings often do not only represent statements of opinion, or even the judgement of experts, but can also be imbued with the power of law.

◆ Negative rating changes, especially those for sovereign debt, can have a significant spillover effect on other agents on the financial markets, even if their probability of default is not called into question at the time.

◆ Through herd behaviour and cliff-effect phenomena, sudden rating changes, especially in a prevalent climate of uncertainty, can have a disproportionate impact, compared with the underlying financial information itself. This can have the consequence that companies facing, potentially surmountable, difficulties are pushed into default by a sudden loss of trust with the investors and the resulting drastic rise in risk premiums.

The possible alternative structures for the credit rating industry in Europe, which will be presented in the next sub-chapter, will be measured against these factors. That means, that they will be discussed and analysed in light of their potential in either increasing the average quality of ratings, or in reducing the negative economical impact of rating downgrades. Either way, or a combination of both could be of value in increasing the stability of Europe's financial markets, as the preceding chapter on the causes and consequences of volatile ratings in times of crisis has pointed out. From the following strategies, a selection will be made for being modelled in an agent-based simulation.

4, Alternative Credit Rating Systems for Europe

The single most striking main reason behind the conflicts of interest influencing CRAs, is widely conceded to be the current issuer-pays model of remuneration, which was introduced in the 1970s[139] [140] [141] [142] [143]. The preceding investor-pays concept did not provide an incentive for CRAs to issue biased ratings in contrast. This has spurred much discussion on introducing alternative payment models, in order to eliminate conflicts of interest altogether.

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[139] See Partnoy (2006)

[140] See De La Dehesa (2011)

[141] See Eijffinger (2011)

[142] See Sibert (2011)

[143] See Utzig (2010)

One conclusion that is prevalent in literature however, is that it is no option to directly revert to an investor-pays concept. A main reason for changing the remuneration strategy in the first place, was the free rider problem, which was exacerbated by the advent of commercial photocopying[144]. This meant, that an increasingly large fraction of potential customers opted to obtain illegal copies of the CRA's rating portfolios, which were published and sold on a regular schedule in paper form[145].

From the 70s to now, further huge technological advances have been made, especially on basis of the World Wide Web, which would allow for easier and faster access to restricted rating information, than ever. Therefore there is much doubt, whether the old system would be economically feasible, which means it is no reasonable strategy to simply go back in time with the payment strategy.

Deb and Murphy's paper from 2009, 'Credit Rating Agencies: An Alternative Model', promotes a variation of the basic investor-pays model. The free rider problem is acknowledged in their work, but it is postulated, that only a certain fraction of investors would opt to take advantage of illegal copies of the CRA's information products. This is because timely and reliably collected information is of crucial importance on today's financial markets. Deals are often made electronically and information lags produce very high opportunity costs in such an environment[146].

Therefore investors that make use of free-riding would be at a competitive disadvantage, compared to subscribers of a CRA's reports and analyses. Deb and Murphy draw the conclusion that only a certain percentage of investors would therefore choose to make use of the cheaper, but less effective, option and wait for leaked rating information to reach them. A large segment of customers willing to pay an agency's fee, in order to gain access to more timely and complete information, would still remain[147].

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[144] See Sylla (2001)

[145] See Deb, Murphy (2009)

[146] See Deb, Murphy (2009)

[147] See Deb, Murphy (2009)

Still, there can not be serious doubt on the fact, that the CRAs would be facing at least a partial loss of revenue, if they took up the investor-pays model again. Even if legislation required all of them to do this, so that no competitive disadvantages would arise from the move, the negative impact on the industry would be noticeable. Amongst other consequences, the market would possibly become completely unattractive to new entrants, and rating quality might also suffer from the need to conserve resources on the CRA's part.

The solution that is proposed for this problem, is a tax funded government subsidiary for rating agencies, that should be measured to balance the losses arising from the free – rider problem. The amount of subsidiary received by a CRA should be determined by an auctioning mechanism[148].

In the opinions of the authors of the paper, this would serve to promote efficiency, rating standards and competition in the industry, as the 'best' CRAs, who provide the most useful information, would profit from sizeable investor-pays revenue, as well as a decent cut of the subsidiary. Furthermore, it would promote competition in the market and might lead to a rising degree of vertical and horizontal diversification among the rating agencies. The subsidiary would be funded by a special tax levied from the bond issuers. As the relation between the total size of the credit rating industry, and the turnover of the worldwide bond markets is approximately 1:1000, this tax would not have to be sizeable, even if a worst-case scenario is assumed, where a large part of customers are lost to the CRAs, due to free-riding[149].

This new remuneration system for CRAs should, according to Deb and Murphy's proposal, be combined with a number of other measures. The most important of these are a ban on rating agency's offering of consulting services and making them legally liable for bad ratings, to a certain degree[150]. The former step would further serve to defuse potential conflicts of interest and might even be a necessary extension to a governmentally supported investor-pays system. This is, because especially when revenue from the debt issuers is lost and competition strengthened in this fashion, CRAs might be tempted to increase their profit in consulting services, which will again lead to a significant interest in retaining debt issuers as long term customers. This factor is again a possible source for biased rating statements.

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[148] See Deb, Murphy (2009)

[149] See Deb, Murphy (2009)

[150] See Deb, Murphy (2009)

The possibility of making CRAs legally responsible for damages caused through bad ratings, is already partly included in EU legislation[151]. Even though the problem remains, how to prove whether a flawed rating decision was caused by gross negligence, intentionally, or just through an 'ordinary' misestimation, the existence of the legal instrument itself might serve to make CRAs more cautious[152].

Altogether the above described approach focuses on increasing the average quality of ratings provided by CRAs. This would be achieved by eliminating the conflicts of interest caused by the current payment model and a ban on offering ancillary services, such as consulting[153]. As a debt issuer would not have the possibility to selectively contract CRAs, rating shopping would become impossible. Viewed from the other side, rating agencies would also not have the possibility to extort potential customers through unsolicited ratings. Thus, measured against the factors described in this work, this strategy could potentially have a noticeable favourable influence on the economic role of the rating industry.

Put against this is the drawback, that subsidiary payments would have to be made in order to counter the free-rider effect. Also, it has to be considered, that such a radical reform would face severe resistance from various directions. Still, because of its potential to eliminate conflicts of interest, this option will be considered in the next chapter of this thesis.

A further interesting notion, which is being widely discussed in Europe after the height of the Sovereign Debt Crisis, is the possibility of transferring rating responsibility to a publicly funded institution. These ratings should focus on sovereign bond issues, and provide an alternative point of view from the competition-driven private CRAs[154][155].

The first potential implementation of this idea is to assign the role of credit risk rater to a pre-existing organization, which is already integrated in the financial markets. Possible candidates that were suggested for this role are the ECB and the IMF. This option would be constrained by severe obstacles, however.

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[151] See Regulation (EU) No 462/2013

[152] See Deb, Murphy (2009)

[153] See Deb, Murphy (2009)

[154] See Véron, Wolff (2011)

[155] See Sibert (2011)

Not only would the trustworthiness of ratings assigned by these institutions be an issue in the eyes of investors, also the notion actually conflicts with the market role currently fulfilled by these bodies. In fact the conflicts of interest arising from this situation would be no less obvious, than those troubling privately owned rating agencies. Not only are ECB and IMF effectively owned by the governments themselves, assigning negative ratings would actually be against their very objectives and purpose.

Would such organizations assign ratings, they might mitigate the potential negative consequences of critical downgrades by the Big Three CRAs by providing a counterweight, but this positive effect would probably be sharply limited by aforementioned problems, while still exposing the reputation of these institutions. Therefore, it can be concluded that giving rating responsibility to existing institutions that are deeply involved with and have a direct interest in the success of the rated issues, would be an ill-advised strategy[156] [157].

Another, perhaps more feasible approach could be the foundation of a dedicated European rating service. Such a European CRA would possibly not only provide an additional point of view to the financial markets, compared to the current situation where the rating industry is so tightly concentrated, but could also reduce reliance on the Big Three agencies in regulatory frameworks, such as the Basel accords. It has to be noted, however, that setting up such an institution from bottom up is no easy task. Building up the necessary structures, expertise and information channels on a scale that is anywhere near Moody's, S&P's or Fitch's would consume a significant amount of time and money[158].

At least in the period of build – up, an European CRA would therefore need to receive significant funding from public sources, most likely the European Commission itself. Although the effect would probably be less severe than if, for example, a rating role would be given directly to the ECB, investor trust might suffer under these conditions. It is difficult to say, how far the distrust would go, but considering the large monetary and political investments necessary to make a European rating agency competitive, the risk that it would fail for reputational reasons remains a significant concern.

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[156] See Véron, Wolff (2011)

[157] See Sibert (2011)

[158] See Eijfffinger (2011)

An even better extension of the idea might have been proposed by Welfens in his 2010 paper 'Transatlantic banking crisis: analysis, rating, policy issues'. Therein, the author proposes the foundation of an institution, which would act as an intermediary between debt issuers and rating agencies. Described in detail, the idea is, that debt issuers would not pay fees directly to the CRAs, but instead to this intermediate platform. This organization will then distribute the rating contracts among the agencies[159].

Mathis, McAndrews and Rochet actually present a very similar approach in their work from 2009, 'Rating the Raters: Are Reputation Concerns Powerful enough to discipline Rating Agencies?'. Therein, the conclusion is drawn, that conflicts of interest do not only generally provide enough incentive to overcome the reputational mechanism, but also are a main cause for inferior rating quality. A central clearing house or depository is suggested as a solution. Like the institution proposed by Welfens, this central platform would be receive the debt issuer's fees, use the CRAs as subcontractors for determining the ratings and oversee the whole process[160].

This specification for creating a European rating platform circumvents most issues that are prohibitive to the two other approaches described above. Conflicts of interest and reputational concerns are not relevant in this case, as the platform would not publish any ratings itself. Also the costs for setting up this agency would be less prohibitive and could be financed through the debt issuer's fees from a quite early stage on. The positive effect would come from preventing a rating bias through conflicts of interest, rating shopping or unsolicited ratings. Therefore, an increase in average rating quality could be attained, provided that the central platform upholds quality standards amongst the subcontracting CRAs. What might be seen as disadvantages, are again the high levels of resistance that are to be expected against such a structural change and the fact that the oligopoly of the Big Three rating companies would likely remain in place. Therefore, the potential impact of rating downgrades will not be mitigated by this strategy alone, even if rating quality rises. Still, this possible option for restructuring the rating industry has some clear advantages and will be further analysed in the next chapter of this work.

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[159] See Mathis, McAndrews, Rochet (2009)

[160] See Welfens (2010)

For limiting the consequences of rating downgrades, an important and much discussed issue is a reduction of the reliance on ratings in legislation. As was noted in the previous sub-chapters, various rating thresholds applicable for different actors on the market, can exacerbate the impact of downgrades, thereby promoting procyclicality and cliff effects. Therefore the idea to replace references to credit risk ratings in regulatory frameworks with different measures, indeed seems to hold some merit. In order to do this, the easiest way would be to use a market-parameter based approach, as is proposed by various authors, either as a supplement, or even as a substitute to external ratings[161] [162].

Partnoy investigates this possibility in his 2006 work, 'How and why Credit Rating Agencies are not like other Gatekeepers', especially looking into the potential of bond spreads, or equity prices as a credit risk measure. By taking an average of these measures and observing them over a longer time, the necessary level of stability for using them in regulation can be attained. Indeed market based measures, which are monitored continuously, may exhibit more stability than ratings, which are changed seldom, but possibly in large steps. Also market participants would find it possible to make statistical predictions on these variables, thus to a certain degree being able to foresee, when a regulatory threshold is reached and a sale of bonds would become necessary. External ratings, generated as they are through the black box of the CRA's models, are much less predictable and thus more likely to induce a sudden systemic shock, when an issue is downgraded to below investment grade[163].

Therefore adopting market based measures in legal frameworks, at least in addition to external ratings, can be expected to reduce the severity of cliff-effects and mitigate the immediate impact of rating downgrades. This step can be taken in addition to a more radical structural change of the rating industry, as was proposed on the preceding pages. The consequences of introducing market based measures to regulatory frameworks, such as Basel, will therefore be evaluated in the next chapter of this work.

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[161] See Véron, Wolff (2011)

[162] See Partnoy (2006)

[163] See Partnoy (2006)

There are of course even more proposals to be found in literature, about how the credit rating industry could be reformed or regulated. Many of these simply focus on enforcing existing rules more effectively however. Regulation of the CRAs has already evolved significantly in the last years however, especially in Europe, where rotational rules and legal liability for ratings have already been introduced. Therefore in order to attain an effective improvement over the status quo, a structural reform seems to be the most promising course of action.

In this sub-chapter, some of the possibilities in this direction have been pointed out. Although the list is not exhaustive, it offers a first basis for further analysis. In order to estimate the consequences of a structural reform, the various proposal will be used for an agent-based simulation in the next chapter. This will allow for at least preliminary conclusions on their effectiveness and possible side-effects. Thus, the construction and interpretation of the simulation model will conclude this paper and provide an extended starting point for further research.

IV, A Simulation Model for the Credit Rating Industry

1, Model Objectives

In the previous chapters, the history, role and organization of credit rating agencies was described. Relevant issues with the current way the rating industry influences the financial markets were pointed out. Finally, a selection of reform proposals addressing these problems was presented and analysed. This theoretical work will be complemented by a computer-based simulation model, which will be described in this chapter. The concept of this simulation is to recreate the dynamics induced by credit rating on a simple financial market model. The main goals of this approach are to validate the theories put forth in the previous part of the thesis, provide a starting point for evaluating the impact of structural changes to the credit rating business and to visualize these findings in a way that makes them more accessible to the reader.

In order to reach these goals, the first step is to specify a simple model of a financial market, dealing in debt instruments. Then the basic mechanics of external credit rating need to be introduced to this market. The simulation furthermore must allow for deficient rating quality, for individual debt issuers, as well as in a systemic context. Also, rating changes should have a non-linear impact on the model outcome. These features are necessary in order to recreate the problems and procyclical dynamics discussed in preceding parts of this thesis. Finally, the model must be able to accommodate and simulate the structural changes of the selected reform scenarios.

The first of these scenarios is the change of the remuneration model of CRAs to a subsidised investor-pays structure, as proposed by Deb and Murphy [164]. The second approach is the introduction of a European platform, that oversees and distributes rating contracts to the CRAs, as described by Welfens (2010) and Mathis, McAndrews, Rochet (2009)[165] [166]. Lastly, a possible extension to these two concepts would be to reduce the regulatory reliance on ratings and to supplement them with market measures. The observations made in working with the model will then be used in order to draw conclusions as to the potential impact of these reform proposals.

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[164] See Deb, Murphy (2009)

[165] See Welfens (2010)

[166] See Mathis, McAndrews, Rochet (2009)

2, Model Methodology

The simulation specifications, as they were described in the last sub-chapter, need to cover relatively complex dynamics and interactions in order for the model to deliver meaningful results. In order to meet this challenge, the method of agent-based modelling was chosen as a promising approach. As for example described in Macal and North's 'Tutorial on agent-based modelling and simulation' (2010)[167], this rather new technique, originating in the 1990s, is especially well suited for building complex systems.

To provide an overview on this method, an agent-based model can be broken down into three distinct component parts[168]:

◆   A set of Agents, which are subject to a set of behavioural rules and can contain information in the form of attributes.

◆   A set of Relationships between Agents, as can be described with a chart of connectedness.

◆   An environment, with which the Agents may interact in addition to other Agents.

The big advantage of this approach is that systems of considerable complexity can be modelled by agents, which only follow very simple rules. Furthermore, the technique can be applied to simulations for widely differing fields of research. A selection of examples includes models on news digital markets, tourism, archaeology, traffic systems and biology[169]. In extension and especially relevant for this thesis, Le Baron's 'Builder's Guide to Agent Based Financial Markets' (2001)[170] provides useful insight on how to implement market systems using the method of agent-based simulation.

As platform for constructing the model, the freely available tool NetLogo has been chosen. Agent-based simulation in NetLogo works via a procedural programming language, that is supplemented by a graphical interface editor.

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[167] See Macal, North (2010)

[168] See Macal, North (2010)

[169] See Macal, North (2010)

[170] See Le Baron (2001)

Railsback's, Lytinen's and Jackson's 2006 article 'Agent-based Simulation Platforms: Review and Development Recommendations', credits NetLogo with excellent usability as well as the most professional documentation on the market and a very large library of examples[171]. NetLogo is comparatively easy to use for researchers without a background in programming or computer science, owing to the fact that it was originally intended as an educational tool.

Despite this, it is a fully capable tool for simulation, including all necessary elements for anything except the most complex or specialized low-level models. In fact, the authors of the above mentioned article originally intended to exclude NetLogo from their research, because at the first glance it appeared to be a too simple tool without the necessary functionality for a wide range of scientific applications. Then, however, they noticed, that all of their example models could indeed be implemented with the tool in a straightforward way, therefore showing that it deserved recognition as a valid instrument for scientific research[172].

Summarised, the excellent documentation and the usability granted by NetLogo's high-level programming language, are the main advantages of this tool. These are probably the main reasons for its status as one of the most-widely used platforms for agent-based simulation[173]. These factors, coupled with it being available free of charge, also provided a strong incentive for using NetLogo for the model in this thesis. Furthermore, it is easy to provide graphical output in a form that can be included in the paper and understood by the reader. The main drawbacks, which is a comparatively slow execution time and a lack of access to low-level features[174], are no serious disadvantages in this context, as the complexity of the model is not too high.

Building on the agent-based approach, the tool NetLogo and, against the theoretical background of the credit rating business, a simple model addressing the objectives set above, can now be introduced.

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[171] See Railback, Lytinen, Jackson (2006)

[172] See Railback, Lytinen, Jackson (2006)

[173] See Railback, Lytinen, Jackson (2006)

[174] See Railback, Lytinen, Jackson (2006)

3, Model Specifications

The design of the basic model that is able to simulate a basic credit instrument market with an external rating mechanism, is built around two types of agents. These agents classes are debt issuers, and investors. The simulation uses a discrete time line, with advances by one period being called 'ticks'. Each tick, every agent from the type of investor chooses one agent from the pool of issuers, whom he gives a loan. This setup forms the core of the model, and is visualized in the chart below, along with more advanced concepts, which will be described further on:
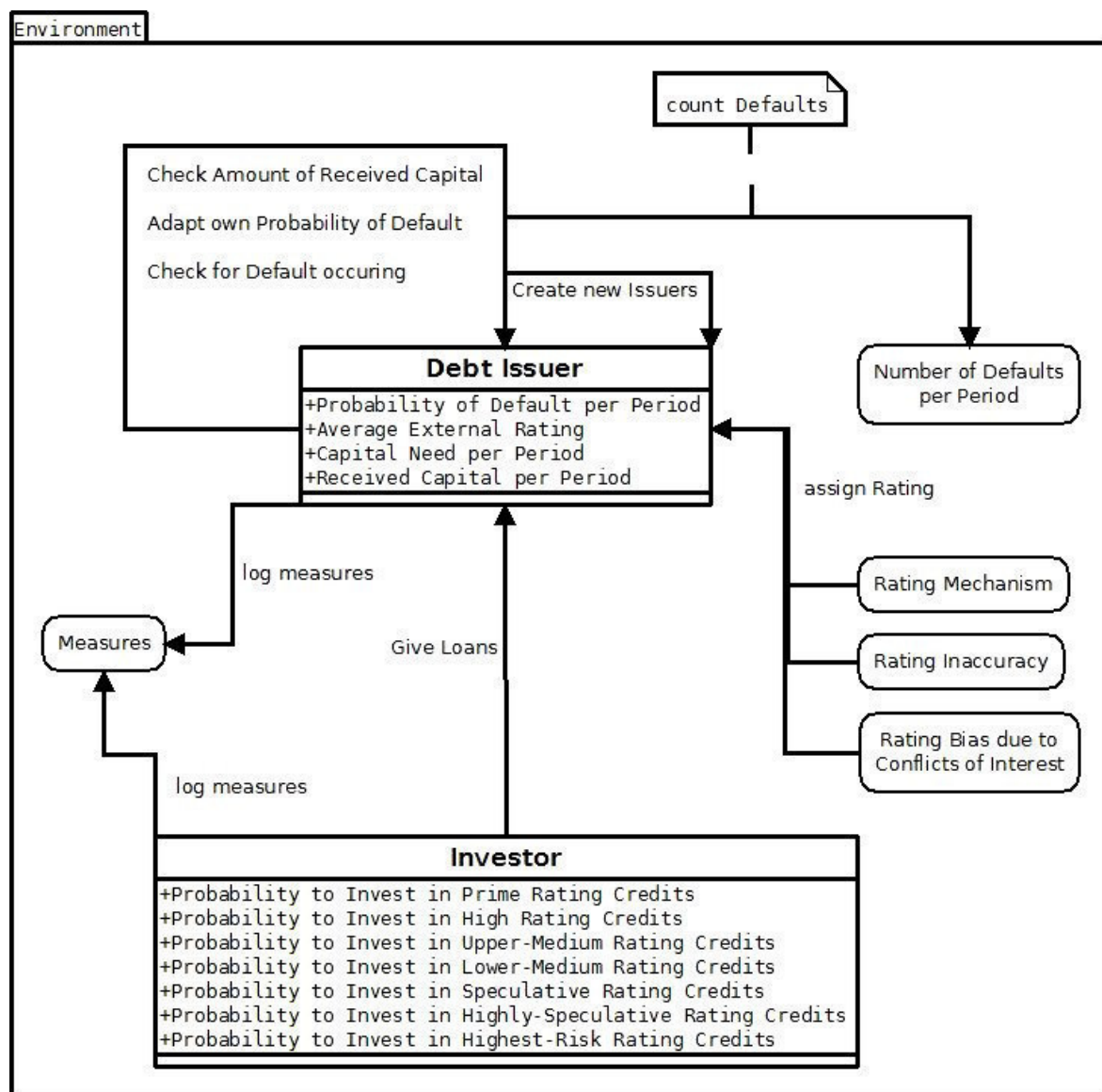

Figure 6 - Structure of the credit market model

Two essential concepts, which contribute to the basis of the model, are the debt issuers' probability of default and capital need.

Indeed all issuer-agents face the possibility that they may go bankrupt and be removed from the simulation at the end of each tick. The chance of this happening, called the **probability of default (*p(d)*)**, is an attribute held individually by each issuer. This value is subject to change over time and in its dynamics is strongly dependent on the factor of capital need. It will to a certain degree also exhibit random increases and decreases, representing the overall financial success of the agent.

The **capital need (*cn*)** is also an individual value each tick and for each issuer and represents the number of credits the agent needs to receive this period for staying fully solvent. If this goal is met, *p(d)* will be inclined to decrease, if not enough investor loans are attracted, *p(d)* will show a trend towards increasing.

The mechanics and relations between these variables work as follows:

The capital need is chosen randomly each turn from a normal distribution with a default mean of 2 and a variance of 2. It is therefore distributed according to:

$$\frac{1}{2\sqrt{2\pi}} e^{-\frac{(x-2)^2}{2*2^2}}$$

The probability of default is assigned a starting value which is also derived from a normal distribution, albeit with a mean of 10 and a variance of 15:

$$\frac{1}{15\sqrt{2\pi}} e^{-\frac{(x-10)^2}{2*15^2}}$$

Each turn, the current *p(d)* is generated by adding the difference of two random floating point numbers (*rx, ry*), between 0 and 15 to the *p(d)* of last tick, thus increasing or decreasing by a random factor.

$$p(_td) = p(_{t-1}d) + (rx - ry)$$

Furthermore, if the difference between *cn* and the **number of received loans (*rl*)** is positive, *p(d)* is increased by 5 times that difference.

If the difference is smaller or equal to zero, *p(d)* is decreased by a fixed amount of 7,5. The probability of default has a lower threshold and can not fall below the value 0.1.

At the end of the period, a random floating point number between 0 and 100 is generated for each issuer. If this number is found to be smaller or equal to the agent's probability of default, bankruptcy occurs and it is removed from the simulation. Furthermore, all loans received by an issuer during the period where he went into default, are counted as loss for the investors on the market. As seen on the mechanisms explained above, the way loans are distributed among the debt issuers is a centrepiece of the simulation. Here, the concept of credit ratings comes into play. Each issuer has a rating value, which represents an average rating assigned by exogenous CRAs. This rating is modelled as a decimal number between zero and seven, representing rating classifications ranging from prime to highest-risk. The table below relates these categories to actual rating levels by the CRAs' respective definitions:

Moody's		S&P		Fitch		rating description
Long-term	Short-term	Long-term	Short-term	Long-term	Short-term	
Aaa	P-1	AAA	A-1+	AAA	F1+	Prime
Aa1		AA+		AA+		High grade
Aa2		AA		AA		
Aa3		AA–		AA–		
A1		A+	A-1	A+	F1	Upper medium grade
A2		A		A		
A3	P-2	A–	A-2	A–	F2	
Baa1		BBB+		BBB+		
Baa2	P-3	BBB	A-3	BBB	F3	Lower medium grade
Baa3		BBB–		BBB–		
Ba1	Not Prime	BB+	B	BB+	B	Non-investment grade speculative
Ba2		BB		BB		
Ba3		BB–		BB–		
B1		B+		B+		Highly speculative
B2		B		B		
B3		B–		B–		
Caa1		CCC+	C	CCC+	C	Substantial risks
Caa2		CCC		CCC		
Caa3		CCC–		CCC–		
Ca		CC		CC		Extremely speculative
		C		C		Default imminent
C		RD	D	DDD	D	In default
/		SD		DD		
/		D		D		

Figure 7 - Rating table and risk categorization[175]

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[175] See http://en.wikipedia.org/wiki/Credit_rating, 05.04.2015

Take note, that for the purpose of this model, the categories 'Substantial risks', 'Extremely speculative' and 'Default imminent' have been aggregated to a level denoted 'Highest risk'. The rating 'In default' is not included in the simulation, as an issuer is dropped from the model as soon as default occurs. This leads to the following categories and number to which they are mapped respectively: prime (0 to 1), high grade (1 to 2), upper medium grade (2 to 3), lower medium grade (3 to 4), speculative (4 to 5), highly speculative (5 to 6), highest risk (6 to 7).

The current rating of an issuer has a direct influence on how many loans it can hope to attract. As explained, each investor considers giving a loan to one randomly chosen issuer each tick. The actual chance, that the credit contract is indeed signed, depends on the individual ratings. This works by way of assigning a percentage for each of the rating levels, for example a 'prime' rating might yield a probability of 95%, whereas a 'speculative' rating might just reach 40%. The actual values can be set for each simulation run and will be separately considered when running the model. Therefore, a company with bad ratings will have more trouble fulfilling their capital need, thus increasing their probability of default, but also on average reducing the loans lost when default does occur.

What needs to be considered next, is the central question on how the ratings are calculated for the issuers. As presented in the theoretical part of this thesis, a credit rating is an estimation of the probability of default, which however is also influenced by several other factors blurring the result. In line with this, the true probability of default of a debt issuer is taken as the basis for its rating. The assignment thresholds are defined as follows:

Probability of Default	Assigned Rating Base Value
$0 \leq p(d) \leq 0.5$	Prime (numeric value 0.5)
$0.5 < p(d) \leq 1.5$	High grade (numeric value 1.5)
$1.5 < p(d) \leq 3$	Upper medium grade (numeric value 2.5)
$3 < p(d) \leq 9$	Lower medium grade (numeric value 3.5)
$9 < p(d) \leq 25$	Speculative (numeric value 4.5)
$25 < p(d) \leq 45$	Highly speculative (numeric value 5.5)
$45 < p(d)$	Highest risk (numeric value 6.5)

These values were calibrated with the help of a study published by Moody's in 2007, which deals with corporate default and recovery rates in the timespan between 1920 and 2006[176]. This paper includes an estimation of default rates per rating category, which served as a starting point for defining the thresholds set above[177]. The numbers were significantly increased for this simulation, so that results can be seen in a more striking way and after fewer periods than on real markets. The relations between default rates for different rating levels factored into the model, however.

In this way, the base for an issuer's average rating value is derived. This base, representing a 'perfect' rating stemming from complete information, is then modified in three further steps. First, a bias for conflicts of interest is factored in. This represents various factors, as described in Chapter IV of this work, which might influence a rating agency to give inflated ratings to their customers. In the model, this is represented by subtracting a fixed factor from each rating, leading to better grades than explained by the probability of default alone. The impact of this bias, denoting the number of rating levels subtracted, can be set dynamically and will be specified for each run of the simulation.

The second factor influencing rating decisions are the reputational concerns of the CRAs, which work as a conflicting force to the aforementioned conflicts of interest. The strength of the reputational concerns is modelled as being dependent on the number of defaults during the last tick (rd). The rationale behind this is, that CRAs will get more cautious in troubled times, where more defaults are likely to occur. This might culminate in waves of downgrades occurring in times of crisis, as could be observed in historical evidence[178]. This dynamic is modelled by adding the relevant value of the following simple exponential function, the basis of which (eb) can be calibrated in the simulation, to the rating base (rb):

$$_{modified}rb = rb + eb^{rd}$$

Third and finally, the rating is subjected to randomization, in order to represent the fact, that a CRA does not have perfect information and its mathematical models might be flawed. This is done by taking the modified rating base as mean of a normal distribution, from which the final rating is then selected. The variance of this distribution can be calibrated as needed:

$$\frac{1}{\sigma\sqrt{2\pi}}e^{-\frac{(x-_{modified}rb)^2}{2*\sigma^2}}$$

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[176] See Hamilton, Ou, Kim, Cantor (2007)

[177] See Hamilton, Ou, Kim, Cantor (2007)

[178] See Benmelech, Dlugosz (2009)

In order to visualize the potential for procyclical impact of credit ratings, include concerns such as herd behaviour and be able to simulate times of crisis, a further dynamic is included in the model. This is, that a high number of defaults during a period is assumed, through market uncertainty, to negatively affect the willingness of investors to give loans. This is represented, by subtracting the number of defaults that occurred during the last tick (*rd*), modified by a factor, from the base probability that a credit contract is entered for a given rating (*p(c)*). This results in the following formula. Note that the factor modifying the number of recent defaults (*df*) can be calibrated in the model interface and will be separately provided for each model run:

$$p_{modified}(c) = p(c) + (df * rd)$$

After this description of the model set-up, it needs to be considered, which benchmarks will be used in order to analyse its results. The main points of interest in this respect, were identified as the number of defaults that occurred, the number of loans given, the average rating and the number of loans lost due to defaults, as well as the development of these measures observed over time. Along this, the development of rating levels provided will also be logged. These observations are expected to allow conclusions to be drawn on the outcome of the simulation runs documented in the next sub-chapter.

4, Simulation Experiments

For the first run of the simulation, the model parameters will be set to a rather balanced configuration. The behaviour of the model under these conditions is meant to serve as a point of reference when predicting the impact of structural reforms in later runs and should represent the current status quo. To this end, the variable values were set as follows:

Rating bias due to conflicts of interest: 2.0

Reputational influence base value: 1.23

Rating inaccuracy variance: 1.2

Mean of issuer capital need per tick: 2.0

Market uncertainty factor for recent defaults: 2.0

Investor loan contract probability for prime credit ratings: 98

Investor loan contract probability for high credit ratings: 92

Investor loan contract probability for upper - medium credit ratings: 83

Investor loan contract probability for lower - medium credit ratings: 75

Investor loan contract probability for speculative credit ratings: 45

Investor loan contract probability for highly speculative credit ratings: 35

Investor loan contract probability for highest risk credit ratings: 25

After letting the simulation run for 100 ticks, an interesting picture of an unstable market presented itself. Plotted over time, the benchmark values exhibited the following characteristics:
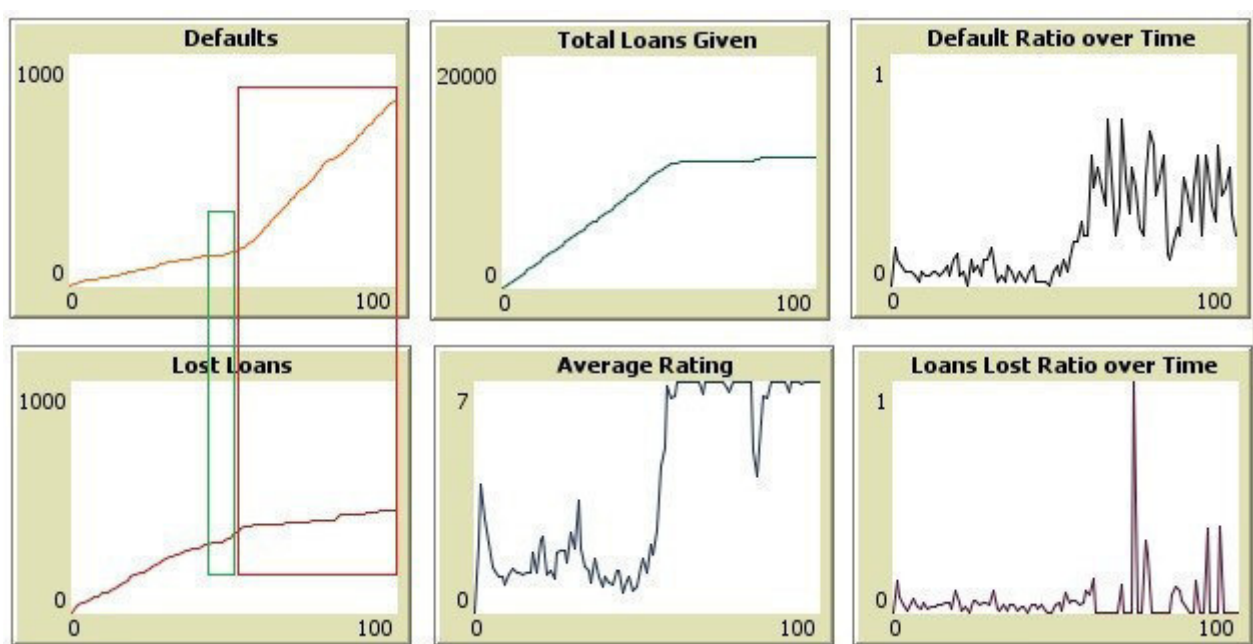

Figure 8 - First simulation scenario, basic

Total Loans Given: 11341

Total Loans Lost: 441

Total Defaults: 804

Loans Lost Percentage: 3.89%

As can be seen, the market behaved very erratic over time, in a short-term as well as a long-term perspective. Small local peaks of defaults occurred in the whole time frame, leading to micro-cycles of rating downgrades, loss of investors and upswings. The ratio of lost loans to issuer defaults was quite close to 1:2. Especially interesting are two periods displaying noticeable long-term dynamics.

As can be noticed, early on after about 40 ticks, there was a short phase of very low default numbers, in the plots it has been marked in green. It can be assumed, due to the mechanics of the model, that the ratings were very high in this period and many loans were given. Reputational concerns were not a factor and ratings were inflated due to conflicts of interest. This created a kind of self-fulfilling prophecy, were also weaker issuers could survive due to plentiful funding by investors, until the defaults of some of these entities ended the boom.

The second, even more pronounced phase where the equilibrium in the model was lost, occurred from the second half of the simulation run. During the timespan marked in red, the system escalated into the opposite extreme. A spike of defaults triggered a crisis, where the investors were reluctant to give loans, leading to even more defaults. As can be seen at the falling statistic of lost loans, the ratings during that time became progressively worse, causing the investors to refrain from entering credit contracts. This caused the default ratio to exhibit a high variance, with a sharply rising tendency. In the end, the state of crisis was practically complete. Indeed the average rating for issuers at tick 100 was '7', denoting highest risk, the worst level possible in the simulation and the average probability of default per tick was 27.69%.

The second run of the simulation will be run with parameters designed to reduce the conflicting forces leading to unstable market dynamics. This simulation can be considered a prelude to the final scenario of a more radical structural reform. It should correspond to a politically enforced code of conduct, including legal liability for bad rating quality and strict rules concerning conflicts of interest. Therefore, this simulation run can be seen as representing an extended and effectively enforced form of the current legislative framework set by Regulation (EU) No 462/2013 in Europe[179]. The simulation parameters were adapted as follows:

Rating bias due to conflicts of interest: 1.0

- reduced due to stricter regulation and more prohibitive penalties for non-compliance.

Reputational influence base value: 1.12

- reduced proportionally, as stricter ratings lead to a reduced necessity of sudden downgrades.

Rating inaccuracy variance: 1.0

- slightly decreased, as legal liability is assumed to lead to stricter quality control.

Mean of issuer capital need per tick: 2.0

Market uncertainty factor for recent defaults: 2.0

[179] See Regulation (EU) No 462/2013

Investor loan contract probability for prime credit ratings: 98

Investor loan contract probability for high credit ratings: 92

Investor loan contract probability for upper - medium credit ratings: 83

Investor loan contract probability for lower - medium credit ratings: 75

Investor loan contract probability for speculative credit ratings: 45

Investor loan contract probability for highly speculative credit ratings: 35

Investor loan contract probability for highest risk credit ratings: 25

After letting the model run for 100 ticks, the plotted benchmark values presented the following picture:
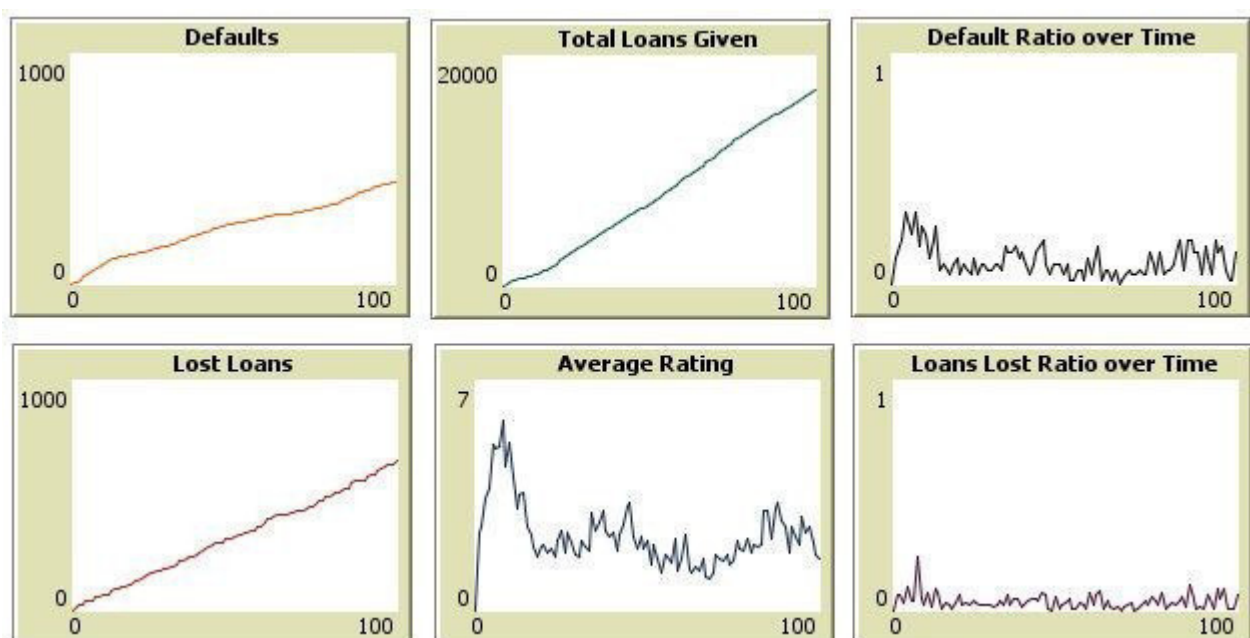

Figure 9 - Second simulation scenario, increased regulation

Total Loans Given: 17057

Total Loans Lost: 648

Total Defaults: 446

Loans Lost Percentage: 3.80%

As can be discerned from these figures, the market exhibited more stable dynamics in this scenario. The default ratio and loan giving behaviour of investors did still exhibit indications of long-term dynamics, as can be seen at the curve of the number of defaults. In fact, at its peaks, the average p(d) for all issuers had exceeded 20%, whereas on total average, the p(d) stood at just below 9%.

Despite this, the market did not tilt into a crisis but remained in a dynamic state, which is the most important contrast to the first simulation run. It has to be noted, though, that during the first 20 ticks a period of instability occurred, where ratings were bad and the number of loans given was very low. Here there was clearly a potential for crisis, which should not be ignored, even though the market recovered in this case.

An interesting development is the way the ratio between defaults and lost loans has changed. The number of lost loans now exceeds the number of defaults, indicating that fewer completely 'starved' issuers had gone into default. Much more loans had been given, than in the first run, leading to fewer defaults.

When analysing the scenario one can therefore argue, that both types of market agents profited. The debt issuers found it easier to receive financing and therefore fewer of them defaulted over time. The investors on the other hand benefited from the opportunity to give more loans, without suffering a higher proportion of losses. This was achieved by basically just making the ratings more stable over time, as the conflicting forces of positive bias and negative reputational concern were both reduced.

What remains to be done in the third and final simulation to be run on the agent-based model, is to test the impact of a structural reform. More specifically solutions dealing with conflicts of interest and procyclicality, just as proposed in Chapter III, will be the focus. Of these ideas, especially the foundation of an intermediate European rating platform strikes out as being especially attractive, as it could effectively eliminate conflicts of interest without putting the profit of the rating industry at risk, as a change of the payment model might do. Additionally, the impact of bad ratings might be mitigated by supplementing external ratings with market measures in the relevant legislation. The following simulation setup will be used in predicting the impact of such a reform on the simple credit market model:

Rating bias due to conflicts of interest: 0
- this factor was eliminated, as it is predicted, that the measures described will remove any incentive for a CRA to issue biased ratings.
Reputational influence base value: 1.08
- decreased due to much stricter ratings to begin with and in case of an intermediate agency, the reduced need to deal with reputational concerns altogether.

Rating inaccuracy variance: 1.4

- increased, as despite controls, rating agencies might start cutting costs in quality control, when their contracts are assigned through an intermediary, or they receive public financing.

Mean of issuer capital need per tick: 2.0

Market uncertainty factor for recent defaults: 2.0

Investor loan contract probability for prime credit ratings: 98

Investor loan contract probability for high credit ratings: 92

Investor loan contract probability for upper - medium credit ratings: 83

Investor loan contract probability for lower - medium credit ratings: 76

Investor loan contract probability for speculative credit ratings: 56

Investor loan contract probability for highly speculative credit ratings: 45

Investor loan contract probability for highest risk credit ratings: 32

- these values were increased, as less reliance on external ratings in regulation takes away some disincentives for investing in lower-graded bonds.

These quite radical changes to the model parameters led to the following results, after a simulation run of 100 ticks:
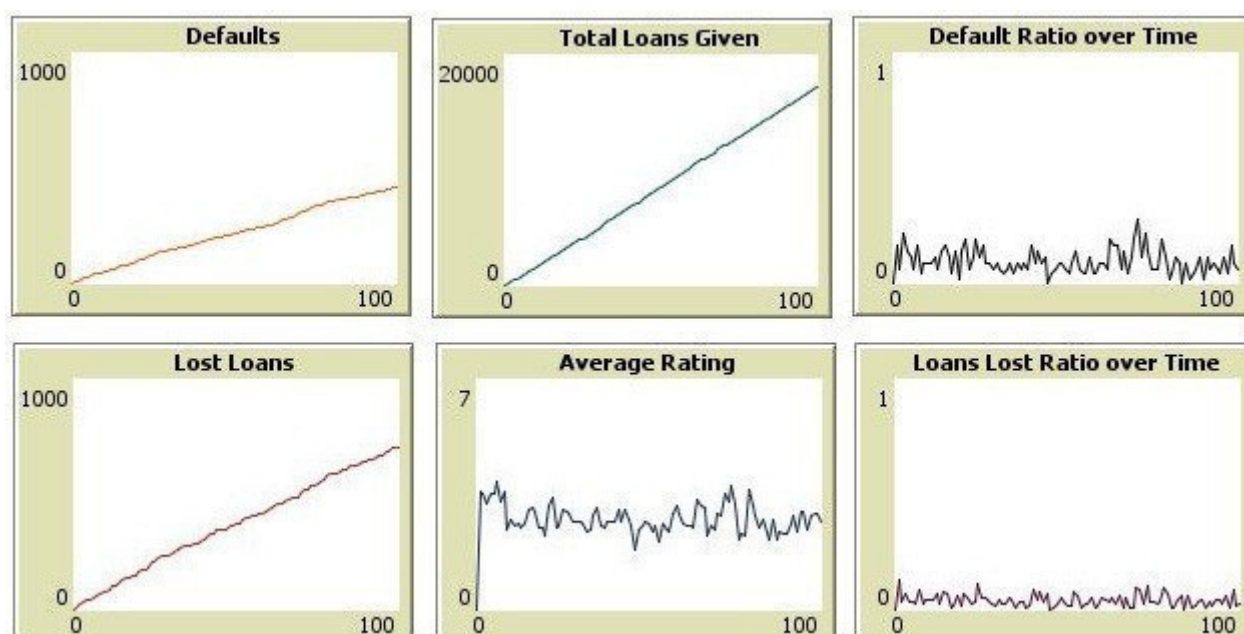

Figure 10 - Second simulation scenario, stuctural reform

Total Loans Given: 17261
Total Loans Lost: 706
Total Defaults: 420
Loans Lost Percentage: 4.09%

The first and most important aspect to note when looking at the benchmarks, is that this simulation run led to the most stable market conditions so far. In contrast to the previous experiments, there were practically no phases of boom or crisis on the market. Ratings, defaults and loan giving behaviour stayed exhibited a very low variance in the time frame. The total numbers stayed very much the same as in the scenario dealing with increased regulation, although there was a slight increase in the proportion of lost loans. Thus, like with the preceding scenario, the results were much more positive than those attained under the basic, unregulated conditions.

Summarized, the main advantage of this simulation run was, that there was no danger of the market losing its state of equilibrium and tilting into crisis. Furthermore, even when taking into account a lower accuracy of ratings, and a worse average level of ratings overall, due to complete removal of conflicts of interest, there was no significant disadvantage for issuers and investors.

The results of the simulations, as presented in this chapter, can therefore be said to support the theories put forth in the preceding parts of the thesis. Ratings inflated by conflicts of interest and subsequent severe downgrading in times of crisis, were found to have a significant destabilising influence on the market model. A mitigation of this issue by stricter regulation, or an altogether elimination of the problem by structural reform, were found to have a stabilizing influence. Also, reducing the immediate impact of downgrades by adapting financial regulation contributed to a stable scenario. Both sides of the debt market, investors and issuers were able to profit from this situation. As this is in line with the arguments cited from scientific sources in Chapter III, the thesis can be concluded with the quite clear result, that a regulation of the credit rating industry would be beneficial to the market and a structural reform, with the introduction of a European intermediate rating platform being perhaps the most realistic approach, is the best course to adopt.

V, Conclusion

This thesis provides an extended study on the credit rating industry. In order to provide context, the reader is first introduced to a structural and historical overview of the credit rating business. Thereafter, the main focus lies on the problems associated with external credit ratings by private companies, such as inaccuracies and bias, as well as the possible impact of such concerns on the financial market. Extending on these issues, several concepts for improving the situation which were proposed in various scientific journals, were examined. In order to provide additional means to evaluate the potential impact of these reform ideas on the European financial structures, an agent - based simulation model was constructed in NetLogo. Finally the thesis is concluded by exploring several scenarios through this model, thereby gaining further insight and a means of validation for the theories included in preceding chapters.

It is found that a majority of the problems associated with credit ratings have their root in two main causes. The first one is the matter of conflicting interests arising from the issuer - pays remuneration model, whereby a debt issuer commonly makes a contract with his own raters, that can lead to a bias in the rating announcements. The second field of concern is the regulatory function performed by rating agencies within the frame of financial legislation. This exacerbates the already significant reliance of market participants on external credit ratings, which can lead to severe procyclical market dynamics in case rating changes are not timely or of sufficient quality.

In order to directly address these problems, three possible concepts are found to be especially promising. The first avenue, proposed by Deb and Murphy (2009)[180], is based on switching the remuneration model for rating agencies to an investor - pays concept supported by a subsidiary, thereby eliminating the source for conflicts of interest. Secondly, and intended to have a similar effect, one paper by Welfens (2010)[181] as well as another one by Mathis McAndrews and Rochet (2009)[182], is based the idea of a public European platform acting as an intermediary between debt issuers and ratings.

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[181] See Deb, Murphy (2009)

[182] See Welfens (2010)

[183] See Mathis, McAndrews, Rochet (2009)

Finally a separate argument pursued by multiple authors, such as Partnoy (2006)[184] and Véron and Wolff (2011)[185], is that external ratings should be supplemented by market measures in financial regulatory frameworks, thereby reducing the reliance of market participants on ratings.

The results yielded by the agent - based simulation indeed support the theory that these steps, intended to remove the bias from ratings and mitigate the rating - related dynamics deteriorating market stability, can be effective for their intended purpose. This is, because more stable ratings which are less susceptible to sudden downgrades in times of crisis, were indicated to be beneficial to all market participants, even when the ratings themselves were more strict than without a structural reform.

Therefore, this thesis has researched and structured information on the state and issues of the current rating industry. Furthermore, possible solutions and reform concepts have been presented and modelled. As this topic remains highly relevant in political as well as economical dimensions, this work is intended to contribute to further research in the field and perhaps even to shaping new market structures for a more stable economical future.

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[184] See Partnoy (2006)

[185] See Véron, Wolff (2011)

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