Why are unsolicited ratings lower than solicited ratings? A theoretical and empirical assessment

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Abstract

This paper analyzes why unsolicited ratings are lower than solicited ratings for comparable firms. We first show for a sample of non-US firms that we can confirm the rating level differences, which have been reported by other researchers. We then develop a theoretical framework and argue that unsolicited ratings might be lower due to purely exogenous reasons such as adverse selection. We further show that unsolicited ratings might also be lower because rating agencies use their market power to force firms to order a paid rating. We then test the theoretical predictions by comparing ex post default rates of firms with solicited and unsolicited ratings in the period January 1996 to December 2005. We find that default rates of firms with unsolicited ratings are significantly lower. This illustrates that unsolicited ratings for non-US firms are not only lower than solicited ratings but they are too low given the predicted default probability expressed by the assigned unsolicited rating. We conclude that rating level differences are not entirely due to exogenous reasons but also to endogenous reasons such as blackmailing.

JEL Classification: G15, G24

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1 Introduction

A common business practice of credit rating agencies like Moody's, Standard and Poor's (S&P) or Fitch is to assign unsolicited ratings. The major distinction between an unsolicited and a solicited rating is that the latter is requested and therefore paid for by the rated firm while the former is neither of the two. Consequently, unsolicited ratings are based on publicly available information only in order to keep the cost of rating preparation low.[1] Rating agencies claim that unsolicited ratings mainly serve as a signalling device, demonstrating their market knowledge even in markets in which they do not dispose of considerable market shares. The publication of unsolicited ratings hence intends to expand the agencies' business activities.

Interestingly, one often observes that unsolicitedly rated firms, who tend to despise this business practice (Economist 2005), request a solicited rating subsequently. Their main argument is that the published unsolicited ratings knowingly underestimate their creditworthiness, thereby driving up funding costs and undermining the firms' competitiveness, so that they feel forced to solicit their rating in order to reveal the true creditworthiness. This accusation - mainly put forward by Japanese authorities and companies - has led to a vehement debate about the use of unsolicited ratings among market participants and observers. In particular, it has spurred regulators in Japan and Germany to debate the usage of unsolicited ratings for regulatory purposes such as capital adequacy guidelines. Generally, the new capital adequacy rules issued by the Basel Committee on Banking Supervision - widely known and referred to as Basel II - allow the use of unsolicited ratings for the determination of regulatory capital according to the standardized approach. However, as mentioned, regulators in Japan and Germany consider an exclusion of unsolicited ratings because of the controversial discussions surrounding them.

Some researchers claim indeed to have found that unsolicited ratings are lower than solicited ratings, ceteris paribus. Among others, this "downward bias" has been emphasized by Fairchild et al. (2006), Poon (2003) and Poon and Firth (2005). These studies compare the rating level of solicited and unsolicited ratings, controlling for firm specific and macroeconomic variables. Using pooled time-series cross-sectional analyzes, they find that unsolicited ratings are on average lower than solicited ratings. According to their results this applies particularly to Japanese companies and, more generally, Asian banks. Implicitly, these studies accuse the major US rating agencies to knowingly underestimate the creditworthiness of these companies, in order to force them to solicit their rating. Put differently, the firms that are rated on an unsolicited basis are blackmailed to make them order and pay for a proper rating. Not surprisingly, these findings feed the critics of unsolicited ratings.

Aggravating the above results, it has been found that also investors take unsolicited ratings very seriously. In a recent study, Behr and Güttler (2006) analyze stock market reactions to the assignment of an initial unsolicited rating and to subsequent changes of the unsolicited rating. They find that investors react to both kinds of events, thereby

[1] Moody's and Fitch claim that their unsolicited ratings contain a private information component. It is, however, clear that this must be a minor component as otherwise the agencies' solicited ratings would be obsolete.

underlining the importance of unsolicited ratings for firms' funding costs.

This work aims at extending the above mentioned studies by investigating in detail the reasons why unsolicited ratings may be lower than solicited ratings. Generally, we may think of two explanatory categories. The first category argues that rating agencies intentionally underestimate the creditworthiness of the unsolicitedly rated firms. The most prominent element of this category constitutes the above-mentioned "blackmailing theory", which will be discussed in more detail in the following sections. Alternatively, we may also think of rating agency conservatism leading to relatively low unsolicited ratings given that agencies dispose of a reduced information set when assigning an unsolicited rating.[2] As the default of a company with a good rating may be more costly to the rating agency with respect to loss of reputation than the default of a company with a bad rating, agencies tend to be conservative when assigning unsolicited ratings. Yet, since the tendency to be overly conservative may also be given when assigning solicited ratings, we will in the following focus on the blackmailing hypothesis within this explanatory category.

The second category, in contrast, features explanations which argue that rating level differences do not rest on deliberate actions by the agencies but are triggered by causes exogenous to the rating process. For instance, since rating agencies use a reduced information set when they assign unsolicited ratings, an unsolicited rating necessarily contains more noise, i.e., the creditworthiness distribution has a greater variance. This may imply that, ceteris paribus, the default threshold of a company with an unsolicited rating is on average more quickly reached than the default threshold of a company with a solicited rating. Since the default threshold coincides with the probability of default which is expressed by the rating level, under this scenario unsolicited ratings must be lower on average. Complementary to this explanation it may be argued that only those firms will solicit a rating, and hence reveal private information about their credit quality, who believe that their unsolicited rating is unfairly low, i.e. who feel to be able to disclose much more optimistic private information to the agency as compared to the available public information. This revelation of positive private information should lead to a solicited rating which is better than the unsolicited rating before. The observed rating level difference would therefore be the result of an adverse selection process: "good" companies, those with positive private information, solicit their rating and reveal the positive information; "bad" companies keep the unsolicited rating until they have positive information to reveal. This "adverse selection hypothesis" has been theoretically analyzed by Bannier and Tyrell (2006) and forms the basis of the second explanatory category that we will test below.[3]

Both categories of explanations for differences between unsolicited and solicited rating levels can be tested by analyzing their different implications on empirical default rates.

[2]The private information, which is an integral part of solicited ratings, does not enter the creditworthiness judgment expressed by the unsolicited rating.

[3]A fifth explanation for the worse rating level of unsolicited ratings argues that the agencies use the "wrong" approach when they prepare ratings for non-US companies. One could, for example, hypothesize that the rating methodology S&P uses for US companies does not take into account the particularities of, say, Japanese companies. While this may be the case, the rating agencies themselves claim that their rating approaches can be applied to companies worldwide. We therefore do not follow this additional explanatory argument any further.

If the first line of explanation holds, such that rating differences are due to intentional actions on the part of the agencies, we would expect the empirical default rates of firms with unsolicited ratings to be significantly lower than the empirical default rates of firms with identical solicited rating. If rating agencies knowingly underestimate the creditworthiness of firms with unsolicited ratings, then these firms should default less often given their rating level. On the other hand, if the second category of explanations were true, we should not see any differences in the empirical default rates between firms with unsolicited and firms with solicited ratings.

Gan (2004) uses a similar analytical approach on a sample of US companies rated by Moody's and S&P and compares the empirical default rates of firms with unsolicited and with solicited ratings. The study shows that the default rates do not differ significantly between the two groups. However, this analysis includes only US firms, so that no general conclusions can be drawn from it, especially if we consider that the public debate focuses primarily on non-US firms. As a first step in our analysis, we therefore replicate the analysis for a sample of non-US firms and investigate whether we can find any level differences between unsolicited and solicited ratings for our sample of firms with unsolicited ratings assigned by S&P in the period January 1996 to December 2005.

In contrast to Gan (2004), we find indeed significant differences between empirical default rates of the two groups. However, our particular data set allows us to investigate the causes of the observed rating level differences in even more detail. Since we analyze a population of firms which all received an unsolicited rating in the sample period, but among which some solicited a rating later on, we are furthermore able to compare these two groups of firms and examine the characteristics of the solicitation decision, controlling for time effects. Our study therefore goes beyond the pooled time-series cross-sectional studies mentioned earlier and allows to differentiate between blackmailing arguments and adverse selection effects driving the rating differences. Eventually, we find that in our sample not only are unsolicited ratings indeed lower than solicited ratings, controlled for firm specific and macroeconomic variables, but we also argue that the observed rating differences are (at least to some extent) due to blackmailing. I.e. we find that empirical default rates for non-US firms with unsolicited ratings are significantly lower than empirical default rates for non-US firms with solicited ratings, controlling for rating level and time effects. Finally, we can show that a large fraction of firms that react to the presumable blackmailing pressure and solicit a rating, experience a rating upgrade. Also, these companies solicit their ratings significantly faster than companies with a later on unchanged or a downgraded rating upon rating solicitation. While our results do not intend to blame rating agencies for any persistent inaccuracies in unsolicited ratings, we may generally state that differences in levels between solicited and unsolicited ratings seem to be driven by endogenous reasons rather than triggered by effects exogenous to the rating process.

In the following, section 2 of the paper empirically analyzes whether in our sample unsolicited ratings are lower than solicited ratings. We then describe a general model in section 3 that allows the derivation of both adverse selection effects - according to Bannier and Tyrell (2006) - and blackmailing effects as possible causes for the observed rating level differences. Section 4 uses empirical default rates for our sample of non-US firms to test the implications of the two theoretical arguments and to differentiate between them. Beyond a pure replication of the analysis by Gan (2004) on our particular

data set, we also examine whether and if so, which companies later on solicit a rating and study both the level changes from the formerly unsolicited to the later solicited rating and the time to transition. Section 5 concludes.

2 Are unsolicited ratings lower than solicited ratings?

The main purpose of our work is to analyze why unsolicited ratings are lower than solicited ratings. In a first step we therefore need to verify the assumption of lower unsolicited ratings. Several authors (Fairchild et al. (2006), Poon (2003) and Poon and Firth (2005)) have indeed found that even after controlling for company-specific development and the macroeconomic environment, unsolicited ratings are on average lower than solicited ones, particularly for Asian companies.[4] They derive this result by collecting data for firms with unsolicited and solicited ratings at certain points in time and using probit regression models to investigate whether the rating levels differ. As our sample differs significantly from the data used in the mentioned earlier studies, we have chosen to redo the analysis in order to see whether the hypothesis of lower unsolicited ratings can be confirmed for our data. Our data set provides one important advantage: all our sample firms received an unsolicited rating in the observation period January 1996 to December 2005. Some of these firms later on solicited their rating. Thus, we are able to subdivide our sample into two groups: companies that remained with an unsolicited rating and others that requested a solicited rating. Obviously, this "rating life cycle" approach allows analyzing rating differences which are due to the rating status in a more isolated way than the pooled time-series cross-sectional approach used in earlier work. Even though previous studies controlled for rating differences caused by company-specific publicly available information, they were not able to control for soft information, such as corporate governance or management quality, which is an essential part of external ratings. While we do not have access to the companies' private information either, following a "rating life cycle" approach should allow a clearer analysis of firm characteristics driving the solicitation decision and the rating process than a simple comparison of two firm groups presumably representing the whole rating universe.

2.1 Descriptive analysis

We first give some insights into the data structure. All firms in our sample were assigned an initial unsolicited rating by S&P in the period January 1996 to December 2005. Rating data were originally obtained from Bloomberg and cross checked with S&P's RatingsDirect database. Table (1) provides descriptive statistics. Panel I contains all firms that received an initial unsolicited rating and subsequently solicited their rating until the end of 2005. 39 (50%) of the rating transitions were upgrades, 34 (43.6%) kept the same rating level as before and 5 (6.4%) were downgraded. To compare these companies with firms which did not request a solicited rating until the end of 2005, we built a stratified random sample. For purpose of exactly timing the rating level and all

[4] Gan (2004) comes to the same conclusion for a comparison between unsolicited and solicited ratings of US firms.

further data of both samples, we stratified the second sample according to the year of the rating transition to a solicited rating. To increase the overall sample size, we chose twice the size of the sample with rating transitions for our stratified random sample, ending up with 156 companies with unsolicited ratings. The two samples do not include any firms from the US because the only US firms for which S&P indicates whether the rating is unsolicited or not are financial institutions. For none of these financial institutions we were able to obtain firm-specific data, which are essential for our later analyses. This owes to the fact that these firms were all part of a large conglomerate or a bank holding.

We find that both samples are dominated by Japanese firms. As more non-Japanese firms seemed to solicit their rating, the ratio of Japanese firms is higher in the stratified random sample. Most of the initial ratings were assigned until 2001 - a finding that holds for both samples. The transitions from an unsolicited to a solicited rating of the 78 firms peaked in 2004, with a share of 37.18% of all rating transitions. Financial firms represent more than 75% in the transition sample; with only 44.87% this ratio is considerably smaller in the randomized sample.

2.2 Empirical results for rating differences between unsolicited and solicited ratings

To analyze whether unsolicited ratings are lower than solicited ratings we use an ordered probit model that controls for publicly available information. We define $rating_i$ as a numerical value representing the rating of company i between 1 and 5 (1 = AAA to AA, 2 = A, 3 = BBB, 4 = BB, 5 < BB), and $rating_i^*$ as the unobserved linking variable, which is continuous and ranges over the set of real numbers. The ordered probit model is specified as:

$$\begin{aligned} rating_i^* = \beta_1 \cdot unsolicited_i + \beta_2 \cdot ln(assets)_i + \beta_3 \cdot profitability_i + \\ \beta_4 \cdot leverage_i + \beta_5 \cdot sovereign\ rating_i + \beta_6 \cdot GDP\ growth_i + \epsilon_i \end{aligned} \tag{1}$$

with

$$rating_i = \begin{cases} 1 & if \quad rating_i^* \quad \epsilon[-\infty, \mu_1], \\ 2 & if \quad rating_i^* \quad \epsilon[\mu_1, \mu_2], \\ 3 & if \quad rating_i^* \quad \epsilon[\mu_2, \mu_3], \\ 4 & if \quad rating_i^* \quad \epsilon[\mu_3, \mu_4], \\ 5 & if \quad rating_i^* \quad \epsilon[\mu_4, \infty], \end{cases}$$

where μ_j, j ϵ [1,..,4], are partition points, *unsolicited* is a dummy variable taking the value 1 for unsolicited ratings and 0 otherwise, *ln(assets)* provides the natural logarithm of company i's assets in 1,000 US-Dollars, *profitability* is defined as operating profits/assets, and *leverage* is the rank of company i's leverage, computed separately for financial and non-financial firms.

Table 1: This table shows descriptive statistics for the rating difference analysis. We use rating data from Bloomberg, which were cross-checked with S&P's RatingsDirect database. The data concerning the business sector come from Datastream. Panel I contains 78 firms that received an initial unsolicited rating in the observation period. These firms solicited their rating until the end of 2005. Panel II contains a stratified random sample of 156 companies with an initial unsolicited rating and no rating solicitation until the end of 2005. The sample was stratified according to the year of the rating transition of the firms in Panel I.

Panel I (n = 78)									
Country	Germany	Italy	Japan	Korea	Singapore	Taiwan	Other Asia	Other Europe	Others
	6.41%	5.13%	47.44%	5.13%	6.41%	6.41%	10.26%	10.26%	2.56%
Year of initial unsolicited rating	1996	1997	1998	1999	2000	2001	2002	2003	2004
	10.26%	48.72%	23.08%	10.26%	1.28%	3.85%	0.00%	2.56%	0.00%
Year of rating transition	1997	1998	1999	2000	2001	2002	2003	2004	2005
	3.85%	3.85%	6.41%	8.97%	10.26%	8.97%	6.41%	37.18%	14.10%
Business sector	Basic Materials	Financials	Healthcare	Industry	Oil/Gas	Retail Goods	Retail Services	Technology	Others
	5.13%	78.21%	0.00%	1.28%	0.00%	3.85%	3.85%	2.56%	5.13%
Panel II (n = 156)									
Country	Indonesia	India	Japan	Phillipines	Thailand	South Africa	Europe	Other Asia	Other
	3.21%	3.85%	63.46%	3.85%	3.21%	2.56%	7.69%	7.69%	4.49%
Year of initial unsolicited rating	1996	1997	1998	1999	2000	2001	2002	2003	2004
	8.97%	32.69%	17.95%	14.74%	16.67%	7.05%	0.00%	1.92%	0.00%
Business sector	Basic Materials	Financials	Healthcare	Industry	Oil/Gas	Retail Goods	Retail Services	Technology	Others
	12.82%	44.87%	2.56%	19.23%	2.56%	6.41%	10.90%	0.64%	0.00%

To include the leverage into our analysis, we split the whole sample into two groups, financial and non-financial firms, since the latter usually exhibit much higher leverage levels. We then assign ranks (in percentage terms) according to the group's rank. The comparison of financial and non-financial firms therefore becomes possible on a relative basis. Size, profitability and leverage are three main company-specific variables that may have a significant impact on the rating level. Hence, we have to control for these impacts to be able to attribute possible rating level differences to the unsolicited-dummy. In addition, ϵ_i is a standard normal error term which contains the residual public and private information of company i.

Further to company-specific variables, the macroeconomic development and the sovereign rating may have an impact on the level of company i's rating. For instance, corporate credit ratings are capped at the sovereign rating, at the so called country ceiling. Thus, to figure out rating level differences, one also has to control for these additional sources of rating level differences. For a second regression model we therefore include two additional variables. We include the *sovereign rating* of company i's country of origin, and *GDP growth*, which is the three-year average of the country-specific GDP growth rate of company i to filter out the impacts of the macroeconomic environment. All independent variables are taken at year end of the previous year according to the transition dates of the companies with a rating solicitation.

The main interest of our analysis applies to the question whether the unsolicited-dummy is significantly greater than zero. This would imply that firms with unsolicited ratings have lower rating levels than those with solicited ratings. Table (2) contains the results of the ordered probit analysis.

Table 2: This table shows the results of a multiple probit analysis with the rating level as the dependent variable. The rating level is expressed as a numerical value for the rating of company i between 1 and 5 (1 = AAA to AA, 2 = A, 3 = BBB, 4 = BB, 5 < BB). The independent variables include a dummy variable taking the value 1 for unsolicited ratings and 0 otherwise, size is the natural logarithm of company i's assets in 1,000 US-Dollars, profitability is defined as operating profits/assets, leverage is given as the leverage rank of company i (computed separately for financial and non-financial firms), the sovereign rating of the country of origin of company i, and the three-year average GDP growth rate of the respective country. Please note that a positive coefficient indicates a worse rating and that we omit the results for the partition points.

	Regression model 1		Regression model 2	
Independent variable	Coefficient	p value	Coefficient	p value
Unsolicited	1.0348	<.0001	1.0649	<.0001
Size	-0.3205	<.0001	-0.2925	<.0001
Profitability	-11.1278	0.0001	-10.4916	0.0002
Leverage	2.1127	<.0001	2.1395	<.0001
Sovereign rating			0.1523	<.0001
GDP growth			-10.1844	0.0322
Mc Fadden adj. R^2	0.1732		0.2171	
Observations	234		234	

We find a robust pattern regarding the unsolicited-dummy. It is positive and highly

significant in both regression models. All of the included control variables deliver explanatory power and the signs of the coefficients are economically reasonable. We find that larger, more profitable and less leveraged companies receive better ratings on average. Firms with their headquarter in countries with fewer credit risk (a better sovereign rating) were also assigned better ratings. It may be surprising that companies of countries with a higher GDP growth receive worse ratings. However, this result can be explained by the large and adverse influence of the Japanese firms, which account for a large proportion in our samples. Since Japanese GDP growth rates were much smaller than (most) of the growth rates of the other countries in the sample, the last coefficient displays the specific circumstances in Japan in the observation period.[5]

Our results largely confirm the findings by Fairchild et al. (2006), Gan (2004), Poon (2003) and Poon and Firth (2005) that unsolicited ratings are lower than solicited ratings after controlling for different risk profiles. However, as mentioned, our particular data structure allows a much more isolated and more detailed investigation of rating level differences between unsolicited and solicited ratings. In the remainder of the paper we want to analyze possible reasons for such differences.

3 Theoretical analysis

Theoretical models on the decision to solicit a rating and on the rating process rest on the interaction between firms, rating agencies and market participants investing into the firms' outstanding debt. With respect to this tripartition of respective "players", we may differentiate between models that focus on the the firm and its strategic decision with regard to rating solicitation (with the agency taking the passive part) and those that emphasize the rating agency's strategic action with respect to the rating announcement. While the former type of model corroborates the above mentioned adverse selection hypothesis, the latter maintains the blackmailing argument. In the following, we will address these two types of models in turn.

For both types of "sub-model", we may consider the following general setting: a risk-neutral firm continually conducts business projects and has to issue claims to raise the necessary finance. In order to keep the analysis as simple as possible, we may assume that the firm conducts one project each period (the firm is hence "identical" to this project) and may therefore focus on only one period. After the publication of a (unsolicited or solicited) rating about the project's (i.e. the firm's) credit quality, risk-neutral market participants choose whether or not to invest, i.e. buy the issued claims. Again, in order to keep the analysis simple, we presume that the project will be successful only if sufficiently many investors donate financing. Otherwise it will be unsuccessful, yielding a payoff of zero (that does not suffice to repay investors).

The firm's project quality is represented by a random variable θ, which is normally distributed with mean y and variance $1/a$.[6] The distribution of θ is assumed to be publicly known. The lower a, the higher is the firm's fundamental risk, since quality θ

[5] The Japanese economy faced a severe downturn in the 1990's, which lasted until the beginning of the 21th century.

[6] Since we assume that one project is conducted at a time, the project's quality will subsume also the firm's quality in this period. We may therefore refer to the project's or firm's quality interchangeably.

may then deviate strongly from the ex-ante expected value y. While the distribution of θ is commonly known, the realization θ, however, is not observable to market participants. Yet, we assume that investors receive individual private information about firm quality: $x_i|\theta \sim N(\theta, 1/b)$. The higher b, the more closely are investors' private signals distributed around the unknown quality θ. In this respect, b denotes the precision of investors' private information.[7] Similarly, a rating agency collects private information about the project (if the rating is solicited, this is based on a process of information sharing between firm and agency) that results in a private signal of $x_A|\theta \sim N(\theta, 1/c)$. Note that, conditional on θ, private signals are assumed to be independent of each other.

In the following we will distinguish between two separate lines of argument. The first one relies on the firm as the active player. She decides whether or not to appoint the agency to assign a (then solicited) rating, based on her expectation about investors' reaction to the solicited rating as compared to an unsolicited rating. The second sub-model, in contrast, emphasizes the agency's endogenous choice with regard to the level of an unsolicited rating and her potential objective of thereby blackmailing the firm into subsequently requesting a solicited rating.

3.1 An adverse selection model

The model presented in this section is a slightly modified version of Bannier and Tyrell (2006). It focuses on the firm's and investors' strategic actions. Investors dispose of one unit of capital and have to decide on whether to invest this unit into the firm's risky project by buying the firm's securities or to invest into a safe asset. The safe asset may be thought of as a simple storage technology. For the project to be successful, a proportion of $1 - \theta$ of the total investment has to be financed externally, i.e. via the buying of claims by investors. Firm quality θ hence represents the firm's ability to internally finance part of the project. If at least $1 - \theta$ of all investors decide to buy the firm's securities, the project will be successful and delivers a payoff of $\bar{V}$ at maturity that allows a repayment of $R > 1$ to each of the investors. An unsuccessful project, in contrast, yields a payoff of zero and hence does not suffice to repay investors. Thus, the "better" the firm's quality, i.e. the higher θ, the higher is the proportion of total financing that the firm can bear internally and the higher is the probability that the project will be successful and debt will be repaid. The agency's rating therefore refers directly to the firm's credit quality.

The sequence of events in the model (that holds for each period) is then as follows:

- In t_{-2}, the firm announces her willingness to conduct a new business project and her need for debt financing. She offers a repayment of $R > 1$ per unit of debt at the project's maturity ($t = 3$). The firm additionally chooses whether or not to appoint a rating agency to assess the firm's quality.
- In t_{-1}, firm quality θ is realized. While its distribution, $N(y, 1/a)$, is common knowledge in the market, the realization itself remains unobservable to market

[7] We may think of investors as institutional market participants who have both strong interest and capability to collect private information about the firm.

Table 3: Investors' strategies and payoffs

	Project successful ($l \geq 1-\theta$)	Project not successful ($l < 1-\theta$)
Invest risky	R	0
Invest safe	1	1

participants. Yet, investors observe individual private signals x_i about firm quality. The agency announces her rating, either solicited, z_S, or unsolicited, z_U.

- In t, investors decide on whether to buy the firm's securities (i.e. invest in the risky project) or the safe asset. Proceeds of the security's sales are invested into the firm's business project.
- In t_{+1}, if at least a proportion $1-\theta$ of market participants decided to invest, the project yields a payoff of $\bar{V}$ and repayment of R is guaranteed. If the project is not successful, in contrast, a payoff of 0 is realized and no repayment to investors takes place.

Investors' payoffs are summarized in table 3. Here, l represents the aggregate amount of investment, i.e. the proportion of investors that decide to buy the firm's securities rather than the safe asset.

Assuming that investors' private information is sufficiently precise, the model can be solved for a unique equilibrium, using the global games approach.[8] As has been shown by Morris and Shin (2003; 2004), the equilibrium will be in trigger strategies, i.e. investors will invest into the risky project if they expect the firm's quality to be sufficiently good (higher than a unique threshold θ^*) and invest into the safe asset otherwise. Equilibrium derivation will then rely on a marginal investor who is indifferent between investing safe or risky. The unique threshold quality θ^* may be translated into a unique private signal x^*, below which investors will optimally invest into the safe asset and above which they will optimally buy the risky security of the firm. Proceeding backwards, we will then solve for the optimal firm decision on whether or not to appoint a rating agency to assess the firm's credit quality.

Indifference on the part of investors requires identical expected payoffs from investing safe or risky. Expectations are based on each investor's private information x:

$$\begin{aligned} \pi_I(\text{safe}) &= \pi_I(\text{risky}) \\ 1 &= R \cdot \text{prob}(\theta \geq \theta^* | x) \; . \end{aligned} \tag{2}$$

Investors' (posterior) expectations with regard to firm quality are based on private and public information about θ. If the firm decided to appoint a rating agency, we

[8] A global game in the sense of Carlsson and van Damme (1993) is a game where each player noisily observes the game's payoff structure (i.e firm quality θ), which itself is determined by a random draw from a given class of games (in our case via a normal distribution). In the following, we will assume that investors' private information is always sufficiently precise, i.e. $b > \min\{(a+c)^2/(2\pi), 4a^2/(2\pi)\}$, so that a unique equilibrium is guaranteed. We may think of investors in our model as mainly institutional investors who usually hold own research departments that deliver sufficiently precise private information.

assume that the solicited rating will be equivalent to the agency's private information, i.e. $z_S = x_A$. Investors' posterior beliefs are therefore distributed as follows

$$\theta|x_i, z_S \sim N\Big(\frac{ay + bx_i + cz_S}{a+b+c}, \frac{1}{a+b+c}\Big) . \tag{3}$$

If the rating is not solicited, in contrast, we may assume that on average the unsolicited rating is equivalent to the mean of public information, i.e. $z_U = y$, so that investors' posterior beliefs are given as

$$\theta|x_i, z_U \sim N\Big(\frac{2ay + bx_i}{2a+b}, \frac{1}{2a+b}\Big) . \tag{4}$$

Plugging these posterior beliefs in (2) delivers the respective indifference condition for the individual investor:

$$x_S^* = \frac{a+b+c}{b}\theta^* - \frac{a}{b}y - \frac{c}{b}z_S - \frac{\sqrt{a+b+c}}{b}\Phi^{-1}\Big(\frac{R-1}{R}\Big) , \tag{5}$$

or

$$x_U^* = \frac{2a+b}{b}\theta^* - 2\frac{a}{b}y - \frac{\sqrt{2a+b}}{b}\Phi^{-1}\Big(\frac{R-1}{R}\Big) . \tag{6}$$

Each investor will invest into the safe asset as long as his private signal indicates a low credit quality of the firm, i.e. if $x_i \leq x_S^*$ resp. x_U^*. Only for sufficiently high private signals $x_i > x_S^*$ resp. x_U^* will investors buy the risky security issued by the firm.[9]

As the firm's project needs a critical mass of external financing in order to be successful, we can derive the equilibrium threshold θ^* that divides unsuccessful from successful projects. The project is on the brink of success if

$$\begin{aligned} 1-\theta &= l = \text{prob}(x \geq x_S^*|\theta) \\ \theta &= \Phi(\sqrt{b}(x_S^* - \theta)) , \end{aligned} \tag{7}$$

respectively, in the case of an unsolicited rating,

$$\theta = \Phi(\sqrt{b}(x_U^* - \theta)) . \tag{8}$$

The condition considers that, due to the independence of private signals, the proportion of investors observing private signals above the threshold x_S^* resp. x_U^* (who are therefore investing in the risky security) is equivalent to the probability with which an individual investor observes a signal above x_S^* resp. x_U^*.

Combining indifference equations (2) and (7), respectively (8), delivers the equilibrium firm quality:

$$\theta_S^* = \Phi\left(\frac{1}{\sqrt{b}}\Big(a(\theta_S^* - y) + c(\theta_S^* - z_S) - \sqrt{a+b+c}\Phi^{-1}\Big(\frac{R-1}{R}\Big)\Big)\right) , \tag{9}$$

respectively

$$\theta_U^* = \Phi\left(\frac{1}{\sqrt{b}}\Big(2a(\theta_U^* - y) - \sqrt{2a+b}\Phi^{-1}\Big(\frac{R-1}{R}\Big)\Big)\right) . \tag{10}$$

[9] One might think of institutional investors who are restricted to investment grade rated issues.

Whenever a firm quality below θ^* is realized,[10] the project cannot be successful because too few investors decide to invest into the risky project and the firm will default on the existing claims.

From an ex-ante viewpoint, the default probability of the firm may therefore be measured by the probability that the realized firm quality will be below θ^*, i.e.

$$\text{prob(default)} = \text{prob}(\theta \leq \theta^*) = \Phi(\sqrt{a}(\theta^* - y)) \tag{11}$$

As can be seen, the probability of default increases in threshold value θ^* and in all parameters that raise this threshold.[11]

We may now proceed and solve for the firm's optimal decision on whether or not to appoint a rating agency. In order to keep the analysis as simple as possible, we assume that the firm aims at maximizing her expected payoff. While with a successful project the firm may claim the difference $\bar{V}-R$ as her part of the project's profit, an unsuccessful project leaves the firm with a profit of zero. As long as $\bar{V} - R > 0$ and constant, the expected firm profit therefore simply hinges on the probability of the project's success, respectively the project's probability of default. Thus, the firm will appoint a rating agency if the announced solicited rating will reduce the probability of default (i.e. threshold value θ^*) as compared to a situation where investors have to make their investment decision based on an unsolicited rating (i.e. whenever $\theta_S^* < \theta_U^*$).

Proposition 1 (Rating solicitation as adverse selection process) *Only those firms will appoint a rating agency to announce a solicited rating, who feel to be publicly "undervalued", i.e. whose precision weighted difference between the presumed solicited rating and the formerly publicly available information about the firm is sufficiently high.*

Proof:

$$\begin{aligned}
\theta_S^* &< \theta_U^* \\
a(\theta_S^* - y) + c(\theta_S^* - z_S) - \sqrt{a+b+c}\Phi^{-1}(\frac{R-1}{R}) &< 2a(\theta_U^* - y) - \sqrt{2a+b}\Phi^{-1}(\frac{R-1}{R}) \\
cz_S - ay &> (c+a)\theta_S^* - 2a\theta_U^* - (\sqrt{a+b+c} \\
&\quad -\sqrt{2a+b})\Phi^{-1}(\frac{R-1}{R})
\end{aligned} \tag{12}$$

q.e.d.

Alternatively, we may assume that by soliciting a rating, the firm influences the precision of the agency's private information, c. This is due to the fact that by sharing private information about the firm's credit quality with the rating agency, the firm may increase the agency's private information precision c as compared to a situation without any information sharing. If by doing so the firm could decrease the threshold θ_S^* up to which the firm will default, she would have an interest into soliciting a rating. The following proposition shows that only those firms will want to solicit a rating, i.e. to increase the agency's private information precision, who are certain to disclose sufficiently "good" information to the rating agency.

[10] In the following, we will distinguish between θ_S^* and θ_U^* only where necessary and write θ^* otherwise.

[11] This setup is similar to the one used by Gordy (2003).

Proposition 2 *An appointment of a rating agency and the subsequent information sharing will be advantageous only for those firms, who may disclose sufficiently optimistic information about their credit quality.*

Proof:

$$\frac{\partial \theta_S^*}{\partial c} = \frac{\phi(\cdot)\frac{1}{\sqrt{b}}}{1-\phi(\cdot)\frac{a+c}{\sqrt{b}}}[\theta_S^* - z_S - \frac{1}{2\sqrt{a+b+c}}\Phi^{-1}(\frac{R-1}{R})] \tag{13}$$

The latter partial derivative is negative (positive) if $z_S = x_A > (<)\theta_S^* - \frac{1}{2\sqrt{a+b+c}}\Phi^{-1}(\frac{R-1}{R})$. q.e.d.

Obviously, therefore, only those firms will request a solicited rating who feel to be unfairly valued by the market and hence believe that their unsolicited rating is too low. If they are confident that they may reveal much more optimistic private information to the agency, they will appoint the announcement of a solicited rating. Certainly, the larger the perceived difference between the optimistic private information and the pessimistic public information, the more urgent is the firms' quest for rating solicitation. Hence, the shorter should be the time between the last announcement of an unsolicited rating and the first announcement of a solicited rating.

The hitherto derived theoretical results allow the formulation of the following testable hypothesis:

Hypothesis 1 (Adverse selection hypothesis)

Only firms of good quality, i.e. which are able to disclose sufficiently good private information about their credit quality, will request a solicited rating. Firms of poor credit quality will remain with an unsolicited rating. On average, both unsolicited and solicited ratings should therefore correctly reflect the firm's credit quality and coincide with observed default rates.

3.2 A blackmailing model

The second sub-model relies on the initial idea by Boot, Greenbaum and Thakor (1993), according to which information intermediaries have to account both for their reputational capital and their financial capital. By guarding her reputation, the rating agency maximizes the value of its rating assessment to market participants, which, in turn, makes it valuable for the firm to request a rating in the first place and guarantees future rating solicitations. On the other hand, the rating agency will also try to maximize the proceeds from each individual rating assessment. Since unsolicited ratings are not paid for, the rating agency would certainly like to talk a firm into soliciting a rating from her in order to increase financial capital.

Both aspects, maximizing reputational capital, the long-run objective, and maximizing financial capital, the short-run objective, may contradict each other. Since a rating agency may maximize financial capital only by conducting solicited ratings, putting too much weight on the short-run objective may lead her to announce a relatively bad unsolicited rating so that the firm will request a better, solicited rating. The following reduced-form objective function mirrors this basic tradeoff between reputation

and blackmailing:

$$u = -(1-\delta)(z_U - \theta)^2 - \delta(z_U - x_A) \ . \tag{14}$$

Here, z_U represents the unsolicited rating. In contrast to a solicited rating, that has been assumed to be equivalent to the private information x_A that the agency observes with regard to the firm's credit quality (and that in a solicited rating process may be enforced by firm in the rating announcement), the agency is relatively free to choose the level of the unsolicited rating. The first argument in the above objective function mirrors the reputational capital that may be maximized by announcing an unsolicited rating that is as close as possible to the true firm quality θ. The second argument represents the agency's financial capital. It may be increased by setting the level of the unsolicited rating below the agency's private signal about the firm's quality. By deliberately underestimating the firm's credit quality, the agency raises the firm's funding costs (provided that investors do react to the unsolicited rating) and may therefore blackmail the firm into soliciting a (then higher) proper rating.

Given the tradeoff between the two arguments in the agency's objective function, the question now is what determines the weights of these arguments, δ and $(1-\delta)$. The following analysis shows that the weights attached to the two different objectives are contingent on the agency's private information about the firm and on the market's expectation with regard to the firm's quality. By maximizing her expected utility:

$$E(u|x_A) = -(1-\delta)(z_u - E(\theta|x_A))^2 - \delta(z_u - x_A) \ , \tag{15}$$

taking into account that $E(\theta|x_A) = \frac{a}{a+c}y + \frac{c}{a+c}x_A$, it follows that

$$-2(1-\delta)(z_u - E(\theta|x_A)) - \delta = 0 \ , \tag{16}$$

such that the "optimal" unsolicited ratings is given by

$$z_U^* = \frac{a}{a+c}y + \frac{c}{a+c}x_A - \frac{\delta}{2(1-\delta)}. \tag{17}$$

While it is easy to see that the - from the agency's point of view - optimal unsolicited rating increases in both y and x_A, more subtle effects are at play with regard to the precision of the agency's private information about the firm's credit quality. It can be shown that for weak precision levels, the unsolicited rating will be relatively low if the agency's private information about the firm is better than the market expectation.

This gives rise to the following proposition:

Proposition 3 (Rating solicitation as blackmailing consequence)

Rating agencies will announce a lower unsolicited rating with decreasing precision of private information if their private signal about the respective firm is better than the market's expectation.

Proof:

$$\frac{\partial z_U^*}{\partial c} = \frac{a}{(a+c)^2}(x_A - y) \tag{18}$$

This partial derivative is positive if $x_A > y$. Thus, the unsolicited rating decreases along decreasing private information precision if $x_A > y$. q.e.d.

This finding is particularly interesting, since rating agencies claim that unsolicited ratings demonstrate their knowledge even for markets where they do not yet possess considerable experience. As such, we may conclude that the private information that agencies collect about these unsolicitedly rated firms is of limited precision. This may give rise to the result that the unsolicited rating will be low particularly for those firms who are of a better quality (i.e. about whom the agencies learn relatively positive information privately) than is commonly expected by the market.

Again, the following testable implications can be derived from the theoretical model:

Hypothesis 2 *(*Blackmailing hypothesis*)*

With relatively opaque information, rating agencies' blackmailing incentives are particularly strong for firms of good quality. These firms therefore receive unsolicited ratings that reflect a too high default probability given their true credit quality. On average, unsolicited ratings are hence biased downwards, i.e. should coincide with lower observed default rates than solicited ratings exhibit.

4 Empirical test of the hypotheses

In this section we pick up the predictions derived in section (3) and investigate whether or not differences in rating levels between unsolicited and solicited ratings are driven by endogenous reasons. Hence, we conduct a horse race between the adverse selection and the blackmailing hypothesis. In order to do so, we replicate the ex-post analysis of empirical default rates conducted by Gan (2004). Gan collected data on unsolicited ratings of US firms assigned by Moody's and S&P and tested whether the empirical default rates of firms with unsolicited ratings differ significantly from the default rates of firms with solicited ratings. The main result of the study is that the empirical default rates do not differ between the two groups. Hence, the paper concludes that, although unsolicited ratings might be lower, there is no intention on the side of the rating agencies. Under this scenario, the rating level differences might simply be the result of an adverse selection process according to which the firms with positive private information order a paid rating and others do not. However, in our opinion this result is not satisfying as it was obtained for a sample of US firms. The public debate about unsolicited ratings focuses almost entirely on unsolicited ratings for non-US firms, especially unsolicited ratings of Japanese firms assigned by US rating agencies. Thus, our sample with unsolicited rating of only non-US firms is better suited to analyze the question of whether there is a blackmailing component in unsolicited ratings than a sample consisting of US firms.

4.1 Univariate analysis

For the following analyzes, we use two realization periods in which we record whether a company defaults or survives until the end of the period. We use Bloomberg rating data with a rating scale of 20 rating classes, ranging from 1 (= AAA) to 20 (= CC/C).

All rating data on unsolicited ratings were cross-checked with S&P's RatingsDirect. In contrast to Gan (2004), who estimated whether a rating was unsolicited or not based on estimates of rating agency fees for bond issuers, we are able to use observable and reliable rating information. Hence, we should have a cleaner data set. As default we define all D, SD and R ratings. Whereas D indicates a regular or full default of a firm, SD signifies a selected default. In the latter case, which was introduced by S&P in 1999, the respective company just stopped its debt service on some but not all of its outstanding obligations. The R rating indicates cases in which financial companies were regulated by national supervisory bodies. Since regulated companies can not freely decide whether to continue their debt repayments, we treat them as defaults.

We start by using one-year realization periods and later extend the analysis to four-year realization periods. For example, we use firm ratings per year-end of 1997 and record whether these companies defaulted or survived until the end of 1998. Then we use all ratings in 1998 and check whether these companies defaulted in 1999, etc. We do this for unsolicited as well as solicited ratings of all non-US firms rated by S&P from January 1996 to December 2005. Our sample thus covers the whole non-US universe of S&P ratings in this period. To exclude the potential effect of right censoring, which might bias the results since we do not know whether the companies would have been able to survive until the end of the realization period or not, we include only companies with valid rating information during the respective realization period.

Table (4) provides a descriptive overview of rating levels for eight one-year realization periods. Panel I shows the mean rating level at a certain point in time for all the companies which did not default (survivors) and Panel II shows the mean rating level for companies that defaulted in the realization period. To derive a meaningful picture we subdivide the samples of survivors and defaults into firms with solicited and unsolicited ratings. In the case of one-year realization periods, we observe a large difference of 2.3 numerical rating notches between the mean rating for the survivors with a solicited rating (7.5) and those with an unsolicited rating (9.8). The latter receive much lower ratings with the same ex-post outcome. This clearly indicates that unsolicited ratings are not only lower than solicited ratings but they are too low given the ex-post realization. In the case of defaulted firms the difference is much smaller with 0.2 rating notches.

As it is often argued that rating agencies use a through-the-cycle approach, it might not be appropriate to use one-year default rates. We therefore undertake the same analysis with two four-year realization periods. We use two points in time, the end of 1997 and 2001, with two realization periods spanning the years 1998-2001 and 2002-2005. The four-year realization periods might better reflect the long-term estimation horizon of agency ratings than one-year realization periods. Table (5) contains the results of the descriptive statistic for these "through-the-cycle" realization periods.

Table 4: This table shows the descriptive statistics for the ex-post analysis with the eight one-year realization periods. We use rating and default data from Bloomberg and RatingsDirect. The former is translated into a scale ranging from 1 (= AAA) to 20 (= CC/C). Panel I shows the mean numerical rating level at a certain point in time for all the survivors in the next year. Panel II provides the same information for the sample of defaults.

	1997	1998	1999	2000	2001	2002	2003	2004	Sum	Mean
Panel I: Survivors										
Number of solicited ratings	862	1,085	1,278	1,450	1,646	1,821	2,042	2,258	12,442	
Mean solicited rating	6.6230	7.0341	7.1299	7.2455	7.4119	7.7035	7.9280	8.0651		7.5219
Number of unsolicited ratings	452	562	632	624	589	476	459	437	4,231	
Mean unsolicited rating	9.5841	9.6619	9.7294	9.6554	9.9355	9.9517	10.0370	10.0092		9.8100
Panel II: Defaults										
Number of solicited ratings	0	15	6	19	42	10	5	1	98	
Mean solicited rating	0.0000	15.5333	13.6667	15.2105	15.3810	17.4000	17.0000	18.0000		15.5816
Number of unsolicited ratings	0	2	7	7	3	4	0	1	24	
Mean unsolicited rating	0.0000	16.5000	15.8571	13.8571	15.0000	18.7500	0.0000	18.0000		15.7917

Table 5: This table shows the descriptive statistics for the ex-post analysis with two four-year realization periods. We use two points in time, the end of 1997 and 2001, with two realization periods spanning the years 1998-2001 and 2002-2005. We use rating and default data from Bloomberg and RatingsDirect. The former is translated into a scale ranging from 1 (= AAA) to 20 (= CC/C). Panel I shows the mean rating level at a given year for all the survivors in the next four years. Panel II provides the same information for the sample of defaults.

	1997	2001	Sum	Mean
Panel I: Survivors				
Number of solicited ratings	754	1,535	2,289	
Mean solicited rating	6.4337	7.3251		7.0315
Number of unsolicited ratings	347	413	760	
Mean unsolicited rating	9.3545	9.6126		9.4947
Panel II: Defaults				
Number of solicited ratings	20	52	72	
Mean solicited rating	12.8000	15.0962		14.4583
Number of unsolicited ratings	12	8	20	
Mean unsolicited rating	12.5000	16.0000		13.9000

It is noteworthy to point out that the sample sizes are much smaller than in the case of the eight one-year realization periods. As we require valid rating information during the respective realization period, less companies fulfill this criterion for the longer realization periods. However, the descriptive analysis of Table (5) looks very similar to the one with eight one-year realization periods. Both univariate analyzes indicate that unsolicited ratings are too low for the survivors given the ex-post realization. We test whether the differences are significant by applying the standard t-test and the Wilcoxon signed ranks test. The results show that the rating differences for the survivors are significantly divergent for both the one- and the four-year realization periods.[12] As an interim result we find that the rating difference is only observable in the sample of survivors. To know more about this difference we subdivide the sample of survivors into firms with investment grade and junk (worse than BBB-) ratings. Table (6) contains the univariate results of the survivors for both realization periods.

In the investment grade section, we find that unsolicited ratings are 1.9 (2.1) numerical rating notches lower than solicited ratings for the one-year (four-year) realization period. However, this is not the case for issuers with junk ratings. For very risky rated companies, we even find evidence that unsolicited ratings are 0.4 numerical notches higher than solicited ratings. This finding becomes comprehensible if we further assess the rating distribution among the junk rated companies. Whereas solicited ratings are more smoothly distributed among the different rating classes, the unsolicited ratings are more concentrated on the full rating classes without the +/- modifiers. Especially the BB rating class accounts for more than 50% of the unsolicited ratings.

Putting the results from the univariate analysis together, we argue that unsolicited ratings of investment grade rated companies, which did not default in our observation period, are too low compared to investment grade rated companies with solicited ratings.

[12] Results are not shown here but are available upon request.

Table 6: This table shows the descriptive statistics for companies which survived the respective realization period. We use rating and default data from Bloomberg and RatingsDirect. The former is translated into a scale ranging from 1 (= AAA) to 20 (= CC/C). We subdivide the samples for the one-year (Panel I) and the four-year (Panel II) realization periods into firms with investment grade and junk (worse than BBB-) ratings. The third column provides the mean rating before the realization period and the forth column the respective difference between companies with unsolicited and solicited ratings. The fifth and sixth column show the p values of the t-test and the Wilcoxon signed ranks test.

	Observations	Mean	Difference	T-test	Wilcoxon
Panel I: one-year periods					
Investment grade					
Solicited rating	9,874	5.9159			
Unsolicited rating	2,669	7.7966	1.8806	<.0001	<.0001
Junk rating					
Solicited rating	2,568	13.6967			
Unsolicited rating	1,562	13.2503	-0.4463	<.0001	<.0001
Panel II: four-year periods					
Investment grade					
Solicited rating	1,906	5.7314			
Unsolicited rating	522	7.8276	2.0962	<.0001	<.0001
Junk rating					
Solicited rating	383	13.5013			
Unsolicited rating	238	13.1513	-0.3500	0.0168	0.0252

These findings, which are robust to different realization periods, seem to be a first hint that differences in levels between solicited and unsolicited ratings are driven by endogenous reasons, i.e., that blackmailing associated with unsolicited ratings for non-US firms might occur.

4.2 Ex-post analysis of the empirical default rates

Based on our results from the previous section, we now want to analyze whether empirical default rates are significantly different between firms with unsolicited and solicited ratings. This analysis resembles the one undertaken by Gan (2004) for a sample of US firms. To test for differences in the empirical default rates we employ a binary probit regression model. We define $default_i$ as a dummy variable indicating whether company i defaulted in the realization period (one for defaults, zero else), and $default_i^*$ as the unobserved linking variable, which is continuous and ranges over the set of real numbers. Hence, we estimate

$$default_i^* = \alpha + \beta_1 \cdot rating_i + \beta_2 \cdot unsolicited_i + \gamma \cdot D_Y + \epsilon_i \tag{19}$$

with

$$default_i = \begin{cases} 1 & if \quad default_i^* > 0, \\ 0 & if \quad default_i^* \leq 0, \end{cases}$$

where *rating* is the rating level of the estimation period expressed as numerical value for company i between 1 (AAA) and 20 (CC,C) that is followed by the realization period in which the default status is recorded, *unsolicited* signifies a dummy for the rating status (1 for unsolicited, 0 for solicited ratings), and *gamma* is a vector of coefficients for a vector of dummy variables, D_Y, for seven of the eight realization periods. The year-dummies are important to control for varying macroeconomic environments, which are known to affect firms' probability of default (e.g. Nickell et al. (2000) and Bangia et al. (2002)).

If unsolicited ratings were not knowingly too low we would not expect any significance in the unsolicited-dummy. The reason for this is that if unsolicited ratings properly reflected the default risk of a firm, the empirical default rates should not differ significantly from the default rates of firms with solicited ratings. The finding that the empirical default rates do not differ could be explained by the adverse selection hypothesis according to which firms with positive private information order a paid rating and firms with no sufficient private information stay with their solicited rating. Hence, from an ex-post point of view, there should be no differences between unsolicited and solicited ratings even though the unsolicited ratings show lower levels than the solicited ratings. However, if unsolicited ratings are endogenously too low then they should be associated with lower empirical default rates. Thus, our unsolicited-dummy in the regression model would be significantly negative. Table (7) contains the results of the probit model (19) with the one-year realization periods.

The results show that the unsolicited-dummy is negative and highly significant. Hence, empirical default rates of firms with unsolicited ratings are significantly lower than the default rates of firms with solicited ratings. We repeat the analysis for a sub-sample of firms without the inclusion of Japanese firms. As most of the criticism against unsolicited ratings is voiced by Japanese firms and officials, one could hypothesize that unsolicited ratings are knowingly too low only for Japanese firms. However, the results of the regression without the inclusion of Japanese firms shows that it is not a mere Japanese "problem". The unsolicited-dummy remains negative and highly significant. It thus seems that unsolicited ratings for non-US firms are knowingly too bad, whether the firms are from Japan or not.

For the two four-year periods we newly estimate the probit model (19). We again split our sample in all non-US firms and non-US firms without Japanese firms. Table (8) contains the results of this estimation.

We again find that the unsolicited-dummy is significantly negative. This confirms our result from the first regression model. As a robustness check we varied the rating level of the unsolicited ratings by steps of 0.5 rating notches. The unsolicited-dummy remains significantly negative if we lower the unsolicited ratings by 0.5 notches. After lowering the dummy by one notch, it is still negative but not significant. When we lower all unsolicited ratings by 1.5 to 2 notches the dummy becomes zero. This illustrates the magnitude by which the default risk of firms with unsolicited ratings is overestimated.

The results obtained in this section stand in sharp contrast to the results obtained by

Table 7: This table shows the probit model results for the ex-post empirical default rate analysis with the eight one-year realization periods. The dependent variable is a default dummy (1 for defaults, 0 else) and the independent variables are: rating indicates the rating level of the estimation period expressed as numerical value for company i between 1 (AAA) and 20 (CC,C) that is followed by the realization period in which the default status is recorded, unsolicited signifies a dummy for rating solicitation (1 for unsolicited ratings, 0 else), and the years 1997 to 2003 control for different macroeconomic environments between the realization periods (the year 2004 is the reference year).

	Whole sample		Non-Japan	
Independent variable	Coefficient	p value	Coefficient	p value
Intercept	-5.9455	0.0001	-5.7409	0.0001
Rating	0.2100	0.0001	0.1995	0.0001
Unsolicited	-0.3744	0.0002	-0.5753	0.0001
Year 1997	-5.7295	0.0001	-5.0213	0.0001
Year 1998	1.2765	0.0001	1.2287	0.0001
Year 1999	1.1461	0.0001	0.8432	0.0076
Year 2000	1.3997	0.0001	1.3482	0.0001
Year 2001	1.5124	0.0001	1.5161	0.0001
Year 2002	0.8176	0.0046	0.7222	0.0143
Year 2003	0.3661	0.2506	0.3580	0.2608
McFadden adjusted R^2	0.3507		0.3530	
Observations	16,795		14,818	

Gan (2004). Gan did not detect any differences of the empirical default rates between US firms with unsolicited and solicited ratings. This led to the conclusion that unsolicited ratings are not too low. Hence, most of the criticism against unsolicited ratings would not be adequate. However, for unsolicited ratings of non-US firms we find diametrically opposite results. We find that unsolicited ratings are too low because firms with unsolicited ratings do not default often enough (the unsolicited-dummy is significantly negative). After excluding the Japanese firms from our sample, the results do not change. These findings indicate that differences between solicited and unsolicited ratings are driven by endogenous reasons, i.e., that unsolicited ratings might contain a blackmailing component.

Our results should also be judged in light of empirical findings in the area of stock recommendations. We argue that it is essential to recognize that investment banks' stock analysts face a similar situation as rating agencies. On the one hand, their compensation often rely upon the analyst's "helpfulness" to the corporate finance division. For example, a better recommendation after an IPO might enhance the probability that the company will include this investment bank in the consortium of the next security issuance. On the other hand, analyst's (external) reputation depends heavily on its forecasting quality.

Michaely and Womack (1999) find for IPOs that in the month after the quiet period,[13] lead underwriter analysts issue 50% more buy recommendations than do analysts of

[13]The quiet period lasts 25 days after the company's IPO. In this period, analysts are not allowed to

Table 8: This table shows the probit model results for the ex-post default rate analysis with the two four-year realization periods. The dependent variable is a default dummy (1 for defaults, 0 else) and the independent variables are: rating indicates the rating level of the estimation period expressed as numerical value for company i between 1 (AAA) and 20 (CC,C) that is followed by the realization period in which the default status is recorded, unsolicited signifies a dummy for rating solicitation (1 for unsolicited ratings, 0 else), and the year 1997 controls for differences between the realization periods (the year 2001 is the reference year).

	Whole sample		Non-Japan	
Independent variable	Coefficient	p value	Coefficient	p value
Intercept	-4.3219	0.0001	-4.2302	0.0001
Rating	0.2206	0.0001	0.2156	0.0001
Unsolicited	-0.3659	0.0048	-0.5922	0.0003
Year 1997	0.3442	0.0040	0.2716	0.0384
McFadden adjusted R^2	0.3050		0.3065	
Observations	3,141		2,799	

other investment banks. Second, they observe significantly inferior short and long performance of lead underwriters' buy recommendations. In the latter case, the difference between the underwriter and non-underwriter mean size-adjusted buy-and-hold return accounts to more than 50% for a two year period beginning after the IPO.

In a more recent paper, Barber et al. (forthcoming) test the SEC's accusation against several investment banks that analyst conflicts of interest resulted in a reluctance to downgrade buy-rated stocks during the bear market of the early 2000s. In a sample period from 1996 to mid-2003, they find that independent research firm buy recommendations outperform those of the investment banks by a daily abnormal return of 3.1 basis points. Partitioning the time frame into the period prior to the market peak in March 2000 and afterwards (the bear market), Barber et al. observe that investment bank buy recommendations are outstanding subsequent to equity offerings significantly underperform the congruent buy recommendations of independent research firms by 8.7 basis points during the bear market.

4.3 Blackmailing and the time to transition

Assuming that blackmailing can at least partly explain the rating level differences between unsolicited and solicited ratings, we argue that the blackmailed firms have an incentive to order a solicited rating as quickly as possible. Once they solicit their rating, the blackmailing should end. If blackmailing existed, we would expect that the blackmailed firms should be upgraded when they solicit their rating. In this case, firms which solicit their rating should do so more quickly than firms that do not receive an upgrade when they solicit their rating. If we define the time to transition as the difference in days between the last unsolicited rating and the first solicited rating, then upgraded firms should have a shorter time to transition than other firms.

To test whether this is true, we use the data described in Panel I of Table (1). The

disclose earnings estimates etc to the public.

sample of firms with a rating transition consists of 78 firms. Of these 39 (50%) received an upgrade when they solicited their rating, 5 were downgraded (6.4%) and 34 (43.6%) kept the same rating level. Thus, a first interesting finding here is that the high number of upgrades is uncommon and stands in sharp contrast to the empirical finding that rating downgrades occur more frequently than rating upgrades (c.f. Blume et al. (1998)).

A simple test for differences between upgrades and non-upgrades is to compute the mean (median) time to transition for both groups and test for differences. To do so we group downgraded firms and firms with no rating change together. The mean (median) time to transition for the firms, which received an upgrade, is 927 (712) days, for the other group it is 1,490 (1,436) days. We apply the standard t-test and the Wilcoxon signed ranks rest. Both tests show that the upgrades and the unchanged or downgraded companies have a significantly different time to transition. The time to transition for upgraded firms is significantly shorter (significance for both tests on the 1%-level).

To see whether this result remains robust in a multiple regression setting we specify the following OLS model:

$$\begin{aligned} time_i = \alpha + \beta_1 \cdot upgrade_i + \beta_2 \cdot last\ rating_i + \beta_3 \cdot initial\ rating_i + \\ \beta_4 \cdot ln(assets)_i + \beta_5 \cdot profitability_i + \beta_6 \cdot leverage_i + \beta_7 \cdot JP_i + \\ \beta_8 \cdot financial_i + \beta_9 \cdot sovereign\ rating_i + \beta_{10} \cdot GDP\ growth_i + \epsilon_i \end{aligned} \tag{20}$$

where $time_i$ is the time to transition of firm i measured in 1,000 days, *upgrade* is a dummy variable taking the value 1 for upgrades and 0 otherwise, *last rating* is the last unsolicited rating of the company before the rating solicitation as numerical value between 1 (AAA) and 16 (B- or worse), *initial rating* is a dummy-variable, which denotes whether the last rating before the rating transition was the initial pi-rating (1 if last rating before the transition was the initial rating, 0 otherwise), *ln(assets)* provides the natural logarithm of company i's assets in 1,000 US-Dollars, *profitability* is defined as operating profits/assets, *leverage* is the rank of company i's leverage, computed separately for financial and non-financial firms (the leverage rank is computed in the same way as above)[14], *JP* is a dummy variable (1 for firms from Japan, zero otherwise), *financial* is a dummy variable to indicate whether a sample firm is from the financial sector (1 if the firm is a financial firm, zero otherwise), *GDP* is the country-specific 3 year average GDP growth rate prior to the year of the rating transition, and *sovereign rating* is the country rating valid for the country of origin of company i at the time of the rating solicitation.

If our empirical prediction were true, we would expect that the upgrade-dummy is significantly negative. A negative sign of the coefficient means that firms, which received a rating upgrade, ordered a solicited rating faster than firms, which remained at the same rating level or were downgraded. This would indicate that blackmailed firms react to the blackmailing and order a solicited rating. They do that more quickly than other firms and receive an upgrade upon the rating solicitation. We estimate equation (20) via OLS. Table (9) contains the results of the regression.

[14]Size, profitability and leverage are taken as level variables per year-end prior to the year in which the rating transition took place. The results do not change if we take three-year averages instead.

Table 9: This table shows the results of a multiple OLS regression with the time to transition as the dependent variable. The latter is measured in 1,000 days from the last unsolicited rating assignment to the day on which the firm solicited its rating. Upgrade denotes whether the company received an upgrade or not, last rating is the rating level of the last unsolicited rating, initial rating indicates whether the last rating before the rating solicitation was the initial unsolicited rating, size provides the natural logarithm of company i's assets in 1,000 US-Dollars, profitability is defined as operating profits/assets, leverage is the leverage rank of the company, calculated separately for industrial and financial companies, JP is a dummy that indicates whether a firm has its headquarter in Japan, financial is a dummy indicating whether the firm is a financial firm, sovereign rating is the country rating at the time of the rating solicitation, and GDP growth is the average growth rate of the 3 years before the year in which the company solicited its rating.

Independent variable	Coefficient	Standard error	p value
Intercept	-1.3172	1.1146	0.2414
Upgrade	-0.5970	0.1872	0.0022
Last rating	0.0354	0.0277	0.2056
Initial rating	0.3924	0.1944	0.0475
Size	0.0919	0.0658	0.1670
Profitability	4.6368	3.4784	0.1870
Leverage	-0.3165	0.3719	0.3977
Japan	0.6730	0.3013	0.0289
Financial	0.2213	0.2700	0.4154
Sovereign rating	-0.0312	0.0333	0.3524
GDP growth	20.9352	8.2159	0.0131
Adjusted R^2	0.1935		
Observations	78		

We see that the upgrade dummy is negative and highly significant. Our finding reflects the fact that firms that receive an upgrade when they solicit their rating have a shorter time to transition. If we believe that some firms are blackmailed by being assigned too low unsolicited ratings then it is also plausible to believe that the blackmailed firms solicit their rating faster than other firms. Furthermore, these firms should receive an upgrade upon the rating solicitation. This is exactly what we find by analyzing the time to transition.

Second, we find a significantly longer time to transition for Japanese issuers. Since these companies are less likely to receive an upgrade when they solicit a rating,[15] it is plausible that they are not too pushy in soliciting a rating.

[15]See for example Nickell et al. (2000) for overall evidence for a higher downgrade probability of Japanese issuers and Behr and Güttler (2006) for results which indicate that these companies are less likely to receive an upgrade of their unsolicited ratings.

5 Conclusion

This work has analyzed possible reasons for rating level differences between unsolicited and solicited ratings. These rating level differences have been reported by other researchers for unsolicited ratings, especially firms from Asia. We first collected a data set of non-US firms that were assigned an unsolicited rating in the observation period January 1996 to December 2005. As some of these firms later on solicited their rating we were able to analyze whether unsolicited ratings really differ from solicited ratings with regard to the rating level. We found that for our data set we can indeed confirm the rating level differences between unsolicited and solicited ratings reported in earlier works. We then developed a theoretical framework and argued that unsolicited ratings might be lower than solicited ratings due to purely exogenous reasons such as adverse selection. On the other hand, it might be that rating agencies use their market power to force firms to order a paid rating, therewith optimizing the rating agency's short-term profit maximization objective. We then tested the model predictions by comparing realized default rates of non-US firms with unsolicited and solicited ratings. We found that even after controlling for the rating level and time effects, firms with unsolicited ratings default less often than firms with solicited ratings. This clearly indicates that unsolicited ratings are not only lower than solicited ratings but that they are too low given the default probability expressed by the assigned unsolicited rating. Hence, endogenous reasons for rating level differences seem to play the major role, indicating that blackmailing may be the main reason for the lower unsolicited ratings. We then investigated whether firms that received an upgrade when they solicited their rating solicited their rating more quickly than firms that kept the same rating level or were even downgraded upon the rating solicitation. Our results show that firms, which are upgraded, solicited their rating significantly more quickly than others. This could be interpreted as a reaction to the blackmailing because firms that are blackmailed are rewarded by lower funding costs when they solicit their rating.

However, we would like to point out that even though endogenous reasons seem to play the major role for the reported lower rating levels of unsolicited ratings, we can not pass final judgment to this endogenous effect. Although our results that blackmailing may exist, there could be other endogenous reasons not captured in the model and the empirical analysis. For instance, it could also be that investors drive the actions of the rating agencies and the firms. In out theoretical framework investors are not tackled as strategic players. If investors do not react to unsolicited ratings, there would be no need for firms to solicit their ratings and, hence, there would be no blackmailing pressure that the agencies may use to force the rating solicitation. Notwithstanding the fact that other endogenous reasons may drive our results, the empirical fact of too low unsolicited ratings cannot be denied given the default rate differences between unsolicited and solicited ratings. It is therefore highly questionable whether unsolicited ratings should really be allowed for regulatory purposes such as the determination of the regulatory capital requirements bank have to hold according to the new Basel II-framework.

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