Risk And Returns Around Bond Rating Changes: New Evidence from the Spanish Stock Market*

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ABSTRACT

This study analyzes the effect of corporate bond rating changes over stock prices. We explore the effects over excess of returns and systematic risk. Rating changes by Moody's, Standard and Poor's or FitchIBCA are analyzed. On an efficient market, these changes will only have some effect if they contain some new information or if they are associated to a redistribution of wealth between shareholders and bondholders. We use an extension of the event study dummy approach. Our results indicate that rating downgrades do not cause abnormal returns around the date of the announcement while upgrades cause significantly negative effect. This behavior reflect a redistribution of wealh behavior. Changes of both directions cause a rebalancing effect in the total risk of the firm, with significant reductions on their systematic componet.

Key Words: Credit Rating Agencies, rating changes, event study, stock returns, event study dummy approach, systematic risk, SUR.

JEL Classification: G12, G14, C34

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ABSTRACT

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1. Introduction

The aim of this study is to explore the corporate bond rating changes effects on market returns and on systematic risk corresponding to firms listed on the Spanish stock exchange. We inquire as to whether the Spanish market values the information that may be contained in the re-ratings from the three largest international agencies: Moody's, Standard and Poor's and FitchIBCA.

Rating agencies assign an initial rating to new bond issues on the basis of the solvency of the issuing firms. This depends on the fundamentals of the firms and on factors related to the industry and the macroeconomic environment[1]. Afterward, agencies successively reevaluate corporate bonds as some of these relevant conditions change.

The information content hypothesis of rating changes has been subject of debate in recent years. According to Wakeman (1990), bond rating agencies only summarize public information. Consequently, no response to rating changes should be observed on an efficient market. On the other hand, agencies claim that they have access to private information. Subsequently, the consecutive reevaluations should have some impact on the market.

These agencies assert as well that bond ratings measure the probability of default on firm's debt. However, the change in the firm's default risk could be due to a change in firm's value or a change in the variance of cash flow. As Zaima and McCarthy (1983) among others point out, this can be related with a redistribution of wealth between stockholders and bondholders (the wealth redistribution hypothesis). This hypothesis states that there is a conflict of interest between bondholders and stockholders. Thus, a credit rating downgrade reduces bond value, which is expropriated from bondholders to stockholders, causing the share

[1] See Crourhy *et al.* (2001) for an analysis of Moody's and Standard and Poor's rating systems.

price to increase. In the case of rating upgrades, the wealth redistribution is in the reverse direction.

A large number of studies have examined the information effect of rating changes on stock returns. The majority have dealt with studying the United States markets. For instance, Wansley and Clauretie (1985), Holthausen and Leftwith (1986) and Cornell *et al.* (1989) present evidence of a negative response in the markets to downgrades in debt ratings, while no reaction is found for upgrades. Hand *et al.* (1992) examine rating changes and announcements of additions to Standard and Poor's Credit Watch List. They exclude those changes that were expected by the market. They find that unexpected downgrades have a negative effect on returns. Along these same lines, Followill and Martell (1997) examine the impact of announcements of future rating reviews and the subsequent changes. They find that review announcements for potential downgrades have a negative impact.

Other authors, such as Goh and Ederington (1993) examine the redistribution hypothesis. They report that not all the rating downgrades are bad news for shareholders. In particular, downgrades due to changes in financial leverage reflect transfers of wealth from bondholders to shareholders. Hence, only downgrades associated with a deterioration in financial outlooks have an effect on the market. In a subsequent study, Goh and Ederington (1999) show that the negative effect of downgrades depends on their characteristics. The impact is greater when they take place in lower categories on the scale. They do not find a relation between the numbers of levels that the rating falls. Likewise, the impact depends on whether the firm obtained abnormally negative returns before the change. This result is also reported by Nayar and Rozeff (1994), who analyze rating changes in commercial paper.

Outside the United States, we found very few similar studies. This fact is probably related to a smaller financing with debt emissions and therefore, to a lesser presence of the rating agencies. However, in the United Kingdom, the results from Barron *et al.* (1997) corroborate those obtained on the American market. Using weekly data, Matolcsy and Lianto (1995) also confirm this result for the Australian market.

On the other hand, only a few works analyze the effect of rating changes on systematic risk. For instance, Impson *et al.* (1992) find that downgrades are associated with an increase in beta. Further, they found that the increase in beta is positively correlated with firm size. However, there is no effect on systematic risk related with rating upgrades.

In this paper, our main purpose is to empirically examine the behavior of stock prices around rating revision announcements in Spanish stock market. This market has clearly different characteristics to the US markets as regards size, liquidity and depth. In this respect, one advantage of this paper is that it presents new evidence on the re-rating effects over stock prices in non-US markets, providing, consequently, an international comparison for the US results.

We analyze daily returns of Spanish companies listed in the Continuous Stock Market. The use of daily data enables us to identify more precisely the moment at which the rating change is made public. The population of all the rating changes between January 1990 and February 2003 is analyzed.

We focus on both the announcement effects on returns and on systematic risk of the re-rated firms. In other words, we analyze the rating change effect on investor valuation of firms. Instead a traditional two-step event study, we present an extension of the dummy variable regression approach proposed by Karafiath (1988), allowing for changes in the beta parameter of the market model. We also allow for autocorrelation and conditional heteroskedasticity in order to estimate the relevant parameters.

In the next section we present the main hypothesis to be tested. In Section 3 the evolution and characteristics of the rating changes in the Spanish market are presented. The methodology and data are described in Section 4. The main results are presented in Section 5. The paper closes with some conclusions in Section 6.

2. The expected effect of rating changes

There are two main theories about rating change announcement effect: (1) Information asymmetry and signalling hypothesis (IASH); and (2) wealth redistribution hypothesis (WRH). Both establish the expected behaviour of re-rated firm returns around the announcement date but they state little on the expected systematic risk behaviour.

In particular, the IASH states that rating agencies are supplied with considerable non-public information about a certain company and thus a rating reclassification may provide additional information to the market about total firm value. Besides, a credit rating change can be viewed as a signal to the market about future earnings and cash flow of the issuer. This way, bond rating changes provide information about changes in firm value. As a result, stock price of downgraded (upgraded) firms should decline (increase). Is important to notice that the IASH does not consider the possible reasons leading to rating changes.

In the other hand, the WRH lies on the conflict of interest between bondholders and stockholders. The existence of limited liabilities may encourage stockholder to increase the expected return by taking on riskier investments. This strategy increases the default risk of outstanding bonds being the source of rating downgrades. Subsequently it causes a reduction of the bond value, which is expropriated from bondholders to stockholders, causing the share price to increase.

The WRH predicts that this kind of rating downgrades (upgrades) will result in the respective issuers' share price to increase (decrease). Hence, only rating changes that are related with changes in financial outlook, without affecting cash flow variance, have an effect on the market in the same direction (negative for downgrades and positive for upgrades).

These two hypotheses do not state the expected behaviour of systematic risk around rating change announcements. Under the assumption that the CAPM is the suitable model for asset pricing, the systematic risk, or beta risk, can be viewed as a measure of organizational effectiveness. The accounting and finance literatures generally agree that company's market valuation is a perceptual assessment of the firm's effectiveness or net preset value. The systematic risk component of total risk of returns capture the risk of an individual firm's security that can not be diversified away by portfolio management. In this sense, this is the only relevant risk for investors. Substantive changes in effectiveness, whatever their causes, should trigger alteration of investor valuation and total risk, including systematic risk.

In general, our contention is that beta risk should be associated with bond rating (as a proxy of valuation of rating agencies of firm's prospects). Both systematic risk and rating provide evidence associated with the organization's worth. It must be expected that any rating change be related with a higher level of uncertainty about the firm. In this sense, we expect that any rating change must be accompanied by a beta change.

In the other hand, any increase in total risk of the firm may be caused by a higher systematic risk, a higher idiosyncratic risk or a higher level of both. In the first and third case we expect that rating changes must be accompanied by changes on the market beta in the opposite direction (positive for downgrades and negative for upgrades). In the second case, we expect no effects on beta risk related with rating change announcements.

3. Rating changes on the Spanish market

Although in countries such as the United States or Canada the majority of corporate bond issues are rated by rating agencies, in the Spanish case there are still only a few companies that have obtained a rating for their bonds. Nonetheless, their number has grown continuously in recent years.

The sample analyzed in this article is made up of the set of companies that received a change in rating in the period from January 1990 to February 2003, and that at the time this change took place were listed on the Spanish Continuous Stock Market. We consider changes in both the debt rating as well as the rating outlook by Moody's, Standard and Poor's and FichtIBCA.

We use several sources to identify the announcement date of rating changes. Two printed news databases: *Baratz* (Servicios de Teledocumentación, S.A.) and *Hemeroteca El País*. Two databases of financial information published over the Internet: *Finanzas* (*www.finazas.com,* Ya.com Internet Factory) and *Invertia* (*www.invertia.com,* Terra Networks, S.A.).[2] We additionally made use of information facilitated by *FitchIBCA* España. The initial sample was made up of a set of 155 rating changes.

[Insert Figure 1]

The annual evolution of the rating changes is presented in Figure 1. As can be seen, the period of analysis is characterized by the growth in the number of rating changes. Continuous growth may also be observed in the number of re-rated firms, from 10 in 1990 to 29 in 2002.

[2] These databases report all the news from the main Spanish newspapers and news agencies. The majority of announcements were found in the business press.

This is mainly due to tree reasons: the increase in the number of firms that use bonds as a method of financing, the internationalization and the development of the Spanish market, which leads to a progressive increase in the number of rated issues, the intention of the main agencies to increase its presence in the Spanish market.

Debt ratings are assigned by the rating agencies at the time of issue and are periodically reviewed. These reviews occasionally entail a change in rating, which reflects the consideration on the part of the agency that an improvement or deterioration has taken place in the credit solvency of the firm. These may be either changes in category or relative position within a specific category or changes in rating outlook. The latter implies an evaluation of the firm's tendencies or risks and their potential impact on the direction of the credit rating of the issuer.

In both cases, we may distinguish between positive changes (which imply an upgrade in the rating) and negative changes (which imply a downgrade). Figure 2 shows the evolution of the changes in the sample according to their sign. As can be seen, during the period under consideration, the number of downgrades was greater than that of upgrades, representing 63% of the total. Moreover, the percentage of downgrades was especially high in the years 1993-94 and 2001-02.

[Insert Figure 2]

The majority of changes affect the category or position assigned to the debt or the firm (77%). Of these, 64% imply a downgrade in credit quality, while 36% imply an upgrade. Of the changes in outlook, 57% correspond to a downgrade.

On the other hand, we divided the rating changes according to the sector of the issuing firm. As can be seen in Figure 3, the majority of changes affected the financial sector (57%). In Spain, this sector concentrates the majority of firms that issue corporate bonds. The following sector is the energy sector, comprising 19% of the changes, followed by transport and communications with 10%, and capital goods with 9%.

[Insert Figure 3]

4. Data and methodology

We used a extension of the dummy variable regression (DVR) approach discussed in Karafiath (1988). The DVR can be represented as:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \gamma_{s,i} D_{s,t} + u_{it} \qquad (1)$$

where R_{it} is the return on stock i at time t from day -115 to day +15[3]; R_{mt} is the return on the market at time t, which we approximate through the Spanish Continuous Stock Market index (IBEX35[4]); $D_{s,t}$ is a dummy variable taking on the value of one for the days in the event window *s=(L, T)* and zero otherwise; $\gamma_{s,i}$ is the cumulative abnormal return, CAR, for firm i on event window; and u_{it} is the error term. Karafiath (1988) has shown that the DVR technique is equivalent to the two-step event study. The model must be estimated for each firm and for the whole sample.

This model ignores the possibility that a debt rating change could exert a destabilizing influence on common stock beta, the measure of the firm's systematic risk. Following Karpoff and Rankine (1994), we account for this possibility by including a four term in Equation (1). The regression models are specified as follows:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \gamma_{s,i} D_{s,t} + \lambda_{s,i} D_{s,t} R_{mt} + u_{it} \qquad (2)$$

where α_i represents the average daily amount by which the stock outperformed the benchmark portfolio on days -115 through L, and $\alpha_i + \gamma_{s,i}$ is the average daily

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[3] Returns are calculated as $R_{it} = Ln\left(\frac{P_{it} + d_{it}}{P_{it-1}}\right)100$, where P_{it} is the price of the stock of firm i on day t and d_{it} is the dividend formally announce on day t.

[4] The data on stock prices and the index were provided by the Madrid Stock Exchange Studies Service. These are daily closing prices corrected for stock splits, equity offerings and mergers effects.

amount by which the stock outperformed the benchmark portfolio on days L through T. Similarly, β_i is the stock's beta with respect to the benchmark portfolio on days -115 through L, and $\beta_i + \lambda_{s,i}$ is the stock's beta with respect to the benchmark portfolio on days L through T. The hypothesis that a debt rating change conveys information to the market about a change in the firm's systematic risk implies that $\lambda_{s,i} \neq 0$.

In order to estimate of Model (2) of , we rule out those cases in which there are other changes in category and/or outlook in the overall period of 131 days (-115,15). Of the 155 changes that made up our initial sample, we ruled out 88 due to their not fulfilling this requisite.

We investigate the existence of a structural change in both, expected returns and systematic risk analysing a post event window from day *L=0* to day *T=15*. We also analyse the impact of rating changes looking at three symmetric windows around the announcement date: (-1,1), (-5,5) and (-15,15).

In a first step, Model (2) is estimated for every firm i in the sample by OLS (Ordinary Least Squared). The parameters estimation may be affected by the presence of autocorrelation and conditional heteroskedasticity in the error term. Both questions may considerably reduce the power of the tests that are usually employed. Also, several studies have reported that stock returns exhibit time varying volatility (see Bollerslev *et al.*, 1992). Reyes (1999) indicates that the omission of conditional heteroskedasticity may bias the systematic risk of small and large firms. For this reason, GLS (Generalized Least Squares) is also used, taking into account residual autocorrelation and GARCH-type conditional heteroskedasticity. More specifically, we estimated Model (2) considering the following behavior for the error term, u_{it}:

$$\begin{aligned} u_{it} &= \sum_{j=1}^{p} \rho_{ij} u_{it-j} + \varepsilon_{it}, \qquad \varepsilon_{it} \sim N(0, h_{it}) \\ h_{it} &= \omega_{i0} + \omega_{i1}\varepsilon_{it-1}^2 + \omega_{i2} h_{it-1} \end{aligned} \tag{3}$$

In order to draw overall inferences for the event, the estimated $\gamma_{s,i}$ or Cumulative Abnormal Return (CAR) for firm i on event window s, are used to find the cumulative average abnormal return (CAAR) for a specific event window s.

$$CAAR_s = \frac{1}{N}\sum_{i=1}^{N}\gamma_{s,i} \tag{4}$$

where N is the number of rating changes in the sample.

The estimated $\lambda_{s,i}$, or Cumulative Changes in Beta (CCB), also must be averaged across event for a specific window s. In particular, the Cumulative Average Change in Beta (CACB) is defined as:

$$CACB_s = \frac{1}{N}\sum_{i=1}^{N}\lambda_{s,i} \tag{5}$$

The null hypothesis of zero abnormal performance due to rating changes imply that CAAR and CACB must be zero. To test the statistical significance of the mean for both series, we use a standard t test:

$$t = \frac{x\sqrt{N-1}}{s_x} \tag{6}$$

were x is CAAR or CACB in each case and s_x is the standard deviation of the N estimates of $\gamma_{s,i}$ (or $\lambda_{s,i}$).

Non-normality (skewness, fat tails) can affect the properties of the parametric tests. In order to overcome this problem we compute two nonparametric tests. First, we use the Fisher sign test. This test counts the number of times that CAR (or CCB) is positive. Under the null the test statistic follows a binomial distribution with p=0.5. Second, the Wilcoxon signed rank test is computed. This test assumes that there is information in the magnitudes as well as the signs. To calculate them, we take the series of CAR (or CCB) and rank them from smallest to largest by absolute value. Then, we add all the ranks associated with positive values. We report p-values for the asymptotic normal approximation to the test. See Sheskin (1997) for details.

To test the rating change efect on risk and return we use a second methodological approach. Following Brook *et al.* (1998), we estimate a Seemingly Unrelated Regression (SUR). This method is designed to simultaneously estimate a system of multiple regressions, which may seem unrelated but where the errors are potencially correlated between different equations. This methosd allow us capture crossectional correlation between events. In particular, the estimated system is:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \sum_{s=1}^{3} \gamma_s D_{st} + \sum_{s=1}^{3} \lambda_s D_{st} R_{mt} + u_{it}, \qquad i = 1,\ldots,N \tag{7}$$

where

$$D_{1t} = \begin{cases} 1 & t \in (-15,-2) \\ 0 & t \notin (-15,-2) \end{cases}; \quad D_{2t} = \begin{cases} 1 & t \in (-1,1) \\ 0 & t \notin (-1,1) \end{cases}; \quad D_{3t} = \begin{cases} 1 & t \in (2,15) \\ 0 & t \notin (2,15) \end{cases}$$

Equation (7) is estimated for the wole sample taking into account the possible presence of residual autocorrelation and heteroskedasticity. In this case, we consider simultaneously three separated windows: the event window (-1, 1), the pre-event window (-15, -2) and the post-event window (2, 15). We test the presence of significant effects related with rating changes in these tree periods.

We test the significance of γ_s and λ_s, *s=1,2,3*. For *s=1* we are testing pre-announcement effects in both abnormal return and systematic risk, for *s=2* we test the effects on the event window and for *s=3* we test post-announcement effects.

5. Results

Two methods described above are used to estimate the Model (2): OLS and GLS. In the second case, the estimation is carried out in several steps. Firstly, we estimate Equation (2) by OLS and test the existence of autocorrelation and GARCH effects. First-order autocorrelation and GARCH(1,1) structure in the error are detected in all cases. Subsequently, we re-estimated incorporating this structure in the error[5,6].

Both of models are estimated for changes in both directions: rating downgrades and upgrades. Besides, we partition the sample into a number of additional groupings to examine the determinants of abnormal returns and changes in systematic risk. The different grouping categories are selected by characteristics of the event, the firm's sector and the reasons behind the rating change. In particular, for changes in both directions, we analyze the whole sample and the sample of non-contaminated changes. As is usual in the literature, we consider rating changes to be contaminated if, during the event period (-15, 15), an event took place that may cause abnormal returns or changes in systematic risk, such as, mergers and takeover, additions to Watch List, etc. 8 of the 67 rating changes analyzed are in this situation.

Moreover, given the strong presence of changes corresponding to firms in the financial sector, we group together the changes in two samples according to whether the companies belong to the Banking and Insurance sector or to the other sectors. The financial sample includes 66% of the total number of rating changes considered (77% in the case of upgrades and 51% in the case of downgrades). The information on these samples is presented in Table 1.

[Insert Table 1]

Finally, in the case of downgrades, we group events by reasons behind the rating change. 15 of these changes are linked to the economic environment, such as, for instance, the Latin American crisis at the end of the 1990's, and the remaining responds to specific, firm-related questions.[7]

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[5] To detect autocorrelation, Durbin and Watson's test and Breush and Godfrey's test are used for orders 1 to 5. For heteroskedasticity, Engle's LM test is used for orders 1 to 5.

[6] The BHHH algorithm is used for GARCH models estimation.

[7] As can be seen in Table 1, all rating upgrades in our sample are due to internal causes.

5.1. Estimation results for rating upgrades

In Table 2 we show the estimation results of Model (2) for the rating upgrades case. Estimated mean, median and standard deviation of CAR and CCB for the four different windows analyzed are shown. For each one, we present the percentage of significant and positively significant $\gamma_{s,i}$ and $\lambda_{s,i}$, t-ratio, sign and signed rank tests. Panel A and B shows results for the whole sample and for the non-contaminated one respectively. In both cases we present the estimation results for GLS and OLS estimation method.

[Insert Table 2]

As can be seen, we find significant abnormal returns in the post-event window regardless of estimation method and test used for both the whole sample and the non-contaminated one. Mean CAR value is –0.2% indicating a decrease in shareholders wealth after the rating change. This result seems to support the wealth redistribution hypothesis. Nevertheless, the sign test indicates that in 24 of the 34 cases the estimated by GLS gamma parameter is positive (23 of the 31 cases for the non-contaminated sample), but only the 22.2% of the significant GLS estimated γ_i parameters are positives.

When symmetric windows are analyzed, we find significant abnormal returns at the 5% significance level for the (-15,15) window when t-ratio test is used in the whole sample, and for windows (-15,15) and (-5,5) in the non-contaminated one. No test indicates significant effect in the shorter event window, but de number of significant parameters is almost two times the number found in the other three windows. However, the number of positives represent a low percentage of whole significantly parameters. Mean CAR estimated in this case is 0.1% in both subsamples (0.2% when OLS method is used). In the event window, the standard deviation is above three times higher than in the other windows.

In the case of CCB results indicate a negative significant effect in the post-event window. Focusing in GLS results, the estimated CCB mean value is -0.19 for the whole sample and -0.17 for de non-contaminated one. This result point out that there is a reduction in systematic risk associated with rating upgrades, suggesting that the detected reduction in returns have been related to a lower valuation of the firm by investors after the rating change. As in the case of abnormal returns, we find no significant effect in the event window (-1,1).

In order to investigate the determinants of this behavior, we group firms by sector. Results (Table 3) are highly different between financial and non-financial sectors. In the first case, results are similar to those for the whole sample, showing significant post-event abnormal returns and significant reductions in systematic risk. Conversely, in the case of rating upgrades affecting bonds from non-financial enterprises we find no significant abnormal stock returns. The effect over systematic risk only appears in the (-15,15) window. This result must be interpreted carefully because there are only 7 rating upgrades in this group.

[Insert Table 3]

5.2. Estimation results for rating downgrades

Table 4 present the results for rating downgrades for the whole sample (Panel A) and for the non-contaminated one (Panel B). This table also shows the estimation results by GLS and OLS. As can be seen, CARs are no significant in any case, indicating that there is no effect in returns related with rating downgrade announcements. This may indicate the wealth redistribution effect in this case negated the information content effect.

The results are highly different when we analyze CCB. Although we find no significant effect in systematic risk in event window (-1,1), the effect is sharply significant in post event window (0, 15) and in the two others symmetric windows around the announcement date (-5,5) and (-15,15), regardless of estimation method and test used. Remarkably that the percentage of significant λ_i parameters in the event window is sharply higher than in the other ones, but the standard deviation of the cross section of CCB in this window is around five times higher than in the other three cases.

This result may indicate that debt rating downgrades leads to a structural change in systematic risk of the re-rated firms. The mean and median CCB is always negative, indicating a lower level of beta risk related with downgrades. These results indicate that the increase in total risk of the firm is due to higher level of idiosyncratic (diversifiable) risk with a rebalancing in the weights of both components of total risk.

[Insert Table 4]

When the sector effect is analyzed (Table 5), main results are maintained for financial firms. When the non financial sector is analyzed we find some differences. First, the GLS estimated absolute values of mean CCB are always lower than the estimated ones for the financial sector. Second, the results depend on the estimation method. With the OLS method, we only find significant effects with all test used for the (-5,5) window.

[Insert Table 5]

Finally, we group rating downgrades taking into account event characteristics. In particular, downgrades related with external (internal) reasons are grouped together. Results (Table 6) are very similar to those find for the whole sample. This indicate that, in general, the market do not distinguish between these different reasons.

[Insert Table 6]

5.3. SUR results

Table 7 shows the results for the SUR estimation described in Equation (7). In this case the effects on pre-event (-15,2) and post-event (2,15) windows are estimated jointly with those in the event window (-1,1). We present results for the whole sample and for the different groups analyzed both in the case of rating upgrades (Panel A) and in the case of rating downgrades (Panel B).

[Insert Table 7]

For the upgrades, we do not find significant effects on abnormal returns in the pre and post event windows in all groups, whereas the effect is significantly negative in window (-1,1) for the whole sample and the financial one. In this sense, the estimated impact over abnormal return seems to be transitory. This indicate that the wealth redistribution hypothesis is supported in the case of rating upgrades in the financial sector firms, and this effect dominate when the whole sample is analyzed.

In the case of systematic risk, we find significant effects in the pre-event windows in the four samples analyzed. In all cases the rating upgrade announcement is preceded by a significant reduction in beta risk. The larger estimated decrease in this parameter is found in the non financial sector, followed by the non contaminated sample.

We find no significant change in systematic risk related with upgrades in the case of the event window for the four samples, while there are a significant drop in beta in the post event window in all samples with the exception of the non financial one. The reduction find in beta risk have a similar size in the pre- and post-event window.

As can be seen, with SUR methodology we also find differences in the rating upgrades effect associated with sector. In all cases these upgrades are related with reductions in systematic risk but, whereas for financial enterprises the effect occurs before and after the announcement, in the case of non financial firms the effect is fully anticipated by the market.

Panel B of Table 7 shows the results for rating downgrades. In this case, there are no significant effect on abnormal returns for all samples and windows analyzed. Conversely, we find significant falls in betas in the event window and in the pre- and post-event ones. In general, the estimated values of λ_i are similar before and after the rating change, while are around two times higher in the announcement window. In the case of downgrades due to internal reasons the estimated λ_i is lower in the post-event window than in the pre-event one. For internal reasons we find the converse effect, being the estimated λ_i lower before the rating change. Again, the non financial group have a slightly different behavior. In this case, rating downgrades do not have any effect in the event window.

Summarizing, we find that rating downgrades are related with a rebalancing in the risk of the firm. Rating agencies announce a higher absolute level of risk but the systematic risk perceived by the market is lower.

6. Conclusions

The financial literature suggests that shareholders may experience significant wealth effects related with corporate debt re-rating. Empirical studies examining the reactions of returns to rating change announcements generally find evidence supporting the information effect hypothesis, with negative effects on abnormal returns in the case of rating downgrades and no effects for upgrades. These studies typically have been concerned with the US market. This paper examine the effect of rating changes announcements on the prices of shares in the Spanish stock market during the period January 1990 to February 2003. In addiction to analyse abnormal returns, this paper explore the effects of rating changes on systematic risks.

In contrast with the previous empirical work, we document significantly negative excess returns for upgrades re-rated firms and no significantly excess returns for downgrades re-rated firms. Furthermore, we find a strong evidence of negative effect on systematic risk around the announcement date for rating changes of both directions. First result, that suggest that there are a wealth transfer from bondholders to shareholders, contributes to the evidence in favour of the wealth redistribution hypothesis found by Goh and Ederington (1993, 1999) among others. With respect to the latter result, as we expect, rating changes are related with a higher level of uncertainty about the firm and with changes in beta risk. We document a rebalancing effect over total risk of the re-rated Spanish firms. Impson *et al.* (1992) find similar effects on beta risk for upgrades.

In general, the incidence of rating change announcements over abnormal returns and systematic risk, are not determined by different factors related with characteristics of the event, the firm's sector and the reasons behind the rating change, although we find a slightly distinct behavior for non financial firms. Finally, our results are largely insensitive to whether parameters are estimated by OLS or GLS method, and to whether we use the SUR technique.

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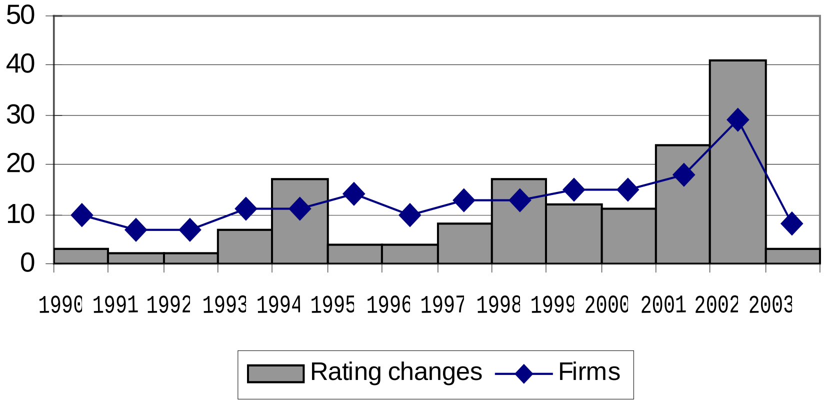
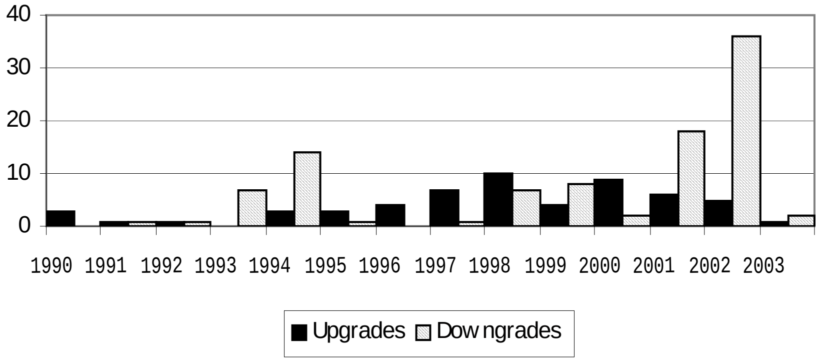
Figure 1.
Rating changes and firms in the sample



Note: 2003 only includes data from January and February

Figure 2.
Upgrades and Downgrades



Note: 2003 only includes data from January and February

Figure 3.
Rating changes by sector

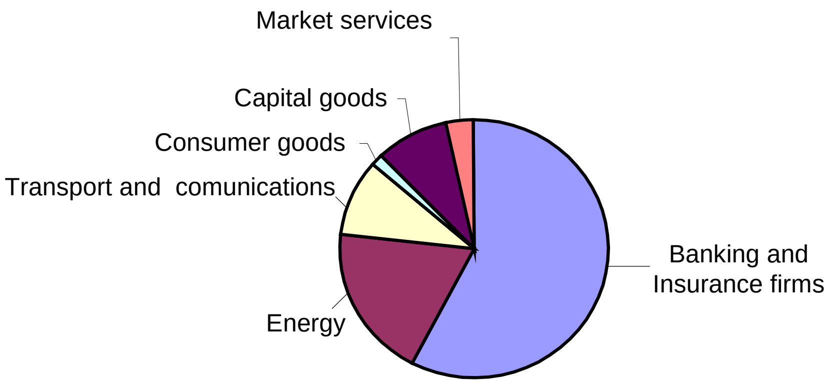


Table 1.
Rating changes analyzed

	Upgrades	Downgrades	Total
Total sample	34	33	67
Non-contaminated sample	31	28	59
Financial sample	27	17	44
Non-Financial sample	7	16	23
External reasons sample	--	15	15
Internal reasons sample	34	18	52

Note: we classify as contaminated those firms that experience material informational events in the (-15, 15) days window around the date of the rating change.

Table 2.

Summaries of results from tests to investigate hypotheses that a rating change corresponds to changes in the firm's return distribution and systematic risk. For each rating upgrade in the sample, equation (2) was estimated using data from days -115 through +15.

$$R_{it} = \alpha_i + \beta_i R_{mt} + \gamma_{s,i} D_{s,t} + \lambda_{s,i} D_{s,t} R_{mt} + u_{it}$$

where R_{it} is the return on stock i at time t; R_{mt} is the return on the market at time t; $D_{s,t}$ is a dummy variable taking on the value of one for the days in the event window s and zero otherwise.

	Panel A: whole sample (N=34)								**Panel B: non-contaminated sample (N=31)**							
	CAR: $\gamma_{s,i}$				**CCB: $\lambda_{s,i}$**				**CAR: $\gamma_{s,i}$**				**CCB: $\lambda_{s,i}$**			
Event window s	**(0,15)**	**(-15,15)**	**(-1,1)**	**(-5,5)**	**(0,15)**	**(-15,15)**	**(-1,1)**	**(-5,5)**	**(0,15)**	**(-15,15)**	**(-1,1)**	**(-5,5)**	**(0,15)**	**(-15,15)**	**(-1,1)**	**(-5,5)**
(1) Estimated for every firm i by GLS (Generalized Least Squares)																
Mean	-0.002	-0.001	0.001	-0.002	-0.189	-0.169	0.126	-0.274	-0.002	-0.001	0.001	-0.003	-0.172	-0.147	0.159	-0.258
Median	-0.002	0.000	0.000	0.000	-0.129	-0.072	0.095	-0.270	-0.002	-0.001	0.000	-0.001	-0.118	-0.065	0.033	-0.243
STD	0.005	0.004	0.022	0.008	0.488	0.338	1.434	0.540	0.005	0.004	0.023	0.008	0.502	0.335	1.487	0.554
% significance*	26.5%	23.5%	47.1%	38.2%	47.1%	41.2%	55.9%	61.8%	29.0%	22.6%	48.4%	41.9%	45.2%	38.7%	54.8%	58.1%
% positive**	22.2%	25.0%	37.5%	23.1%	25.0%	21.4%	42.1%	19.0%	22.2%	28.6%	33.3%	23.1%	28.6%	25.0%	41.2%	22.2%
***t* Test**	-2.754 [a]	-2.152 [b]	0.283	-1.594	-2.256 [b]	-2.909 [a]	0.512	-2.958 [a]	-2.761 [a]	-2.061	0.256	-1.767 [c]	-1.915 [c]	-2.436 [b]	0.594	-2.598 [b]
(p-value)	(0.010)	(0.039)	(0.779)	(0.120)	(0.031)	(0.006)	(0.612)	(0.006)	(0.010)	(0.048)	(0.800)	(0.088)	(0.065)	(0.021)	(0.557)	(0.014)
Sign Test	24 [b]	20	18	19	21	24	18	25 [a]	23 [b]	19	16	19	19	21 [c]	16	22 [b]
(p-value)	(0.024)	(0.392)	(0.864)	(0.608)	(0.230)	(0.024)	(0.864)	(0.009)	(0.011)	(0.281)	(1.000)	(0.281)	(0.281)	(0.071)	(1.000)	(0.029)
Signed Rank Test	2.753 [a]	1.504	0.274	1.231	1.932 [c]	2.530 [b]	0.120	2.804 [a]	2.753 [a]	1.480	0.402	1.656 [c]	1.578	2.126 [b]	0.186	2.479 [b]
(p-value)	(0.006)	(0.133)	(0.784)	(0.218)	(0.053)	(0.011)	(0.905)	(0.005)	(0.006)	(0.139)	(0.688)	(0.098)	(0.115)	(0.034)	(0.852)	(0.013)
(2) Estimated for every firm i by OLS (Ordinary Least Squared)																
Mean	-0.002	-0.001	0.002	-0.002	-0.181	-0.171	0.330	-0.301	-0.002	-0.002	0.002	-0.003	-0.162	-0.149	0.373	-0.285
Median	-0.002	0.000	-0.002	-0.001	-0.130	-0.088	0.102	-0.238	-0.002	-0.001	-0.002	-0.002	-0.115	-0.040	0.099	-0.219
STD	0.005	0.004	0.025	0.008	0.482	0.341	1.700	0.545	0.005	0.004	0.026	0.008	0.488	0.338	1.762	0.559
% significance*	29.4%	26.5%	73.5%	47.1%	41.2%	38.2%	67.6%	50.0%	29.0%	25.8%	77.4%	51.6%	41.9%	35.5%	67.7%	48.4%
% positive**	40.0%	33.3%	40.0%	31.3%	7.1%	15.4%	47.8%	17.6%	33.3%	25.0%	37.5%	31.3%	7.7%	18.2%	47.6%	20.0%
***t* Test**	-2.435 [b]	-2.287 [b]	0.4	-1.708 [c]	-2.185 [a]	-2.926 [a]	1.133	-3.221 [a]	-2.536 [b]	-2.352 [b]	0.368	-1.914 [c]	-1.845 [c]	-2.458 [b]	1.18	-2.84 [a]
(p-value)	(0.021)	(0.029)	(0.692)	(0.097)	(0.036)	(0.006)	(0.265)	(0.003)	(0.017)	(0.025)	(0.715)	(0.065)	(0.075)	(0.020)	(0.247)	(0.008)
Sign Test	23 [c]	20	19	20	20	21	20	24 [b]	22 [b]	19	18	20	18	18	18	21 [c]
(p-value)	(0.058)	(0.392)	(0.608)	(0.392)	(0.392)	(0.230)	(0.392)	(0.024)	(0.029)	(0.281)	(0.473)	(0.150)	(0.473)	(0.473)	(0.473)	(0.071)
Signed Rank Test	2.428 [b]	1.881 [c]	0.667	1.556	1.915 [c]	2.257 [b]	0.513	3.009 [a]	2.499 [b]	1.950 [b]	0.813	2.009 [b]	1.578	1.871 [b]	0.5	2.695 [a]
(p-value)	(0.015)	(0.060)	(0.505)	(0.120)	(0.056)	(0.024)	(0.608)	(0.003)	(0.013)	(0.051)	(0.416)	(0.045)	(0.115)	(0.061)	(0.617)	(0.007)

* Percentage of reject the null hypothesis that the true firm-specific coefficient is zero in favour of the alternative that it is not zero with type I error equal or less than 0.10. ** Percentage of the firm-specific coefficient that are positive over total significative. a, b and c denote statistical significance at the 1%, 5% and 10% level respectively.

Table 3.

Summaries of results from tests to investigate hypotheses that a rating change corresponds to changes in the firm's return distribution and systematic risk. For each rating upgrade in the sample, equation (2) was estimated using data from days -115 through +15.

$$R_{it} = \alpha_i + \beta_i R_{mt} + \gamma_{s,i} D_{s,t} + \lambda_{s,i} D_{s,t} R_{mt} + u_{it}$$

where R_{it} is the return on stock i at time t; R_{mt} is the return on the market at time t; $D_{s,t}$ is a dummy variable taking on the value of one for the days in the event window s and zero otherwise.

	Panel A: financial sample (N=27)								**Panel B: non-financial sample (N=7)**							
	CAR: $\gamma_{s,i}$				**CCB: $\lambda_{s,i}$**				**CAR: $\gamma_{s,i}$**				**CCB: $\lambda_{s,i}$**			
Event window s	**(0,15)**	**(-15,15)**	**(-1,1)**	**(-5,5)**	**(0,15)**	**(-15,15)**	**(-1,1)**	**(-5,5)**	**(0,15)**	**(-15,15)**	**(-1,1)**	**(-5,5)**	**(0,15)**	**(-15,15)**	**(-1,1)**	**(-5,5)**
(1) Estimated for every firm i by GLS (Generalized Least Squares)																
Mean	-0.002	-0.001	0.001	-0.003	-0.215	-0.150	0.111	-0.330	-0.003	-0.001	0.001	-0.001	-0.088	-0.242	0.183	-0.059
Median	-0.001	0.000	0.000	0.000	-0.139	-0.058	0.033	-0.304	-0.005	-0.001	0.000	-0.002	-0.117	-0.107	0.191	-0.213
STD	0.004	0.004	0.024	0.008	0.471	0.355	1.563	0.533	0.006	0.004	0.009	0.006	0.579	0.274	0.851	0.553
% significance*	18.5%	18.5%	51.9%	37.0%	44.4%	44.4%	59.3%	66.7%	57.1%	42.9%	28.6%	42.9%	57.1%	28.6%	42.9%	42.9%
% positive**	20.0%	20.0%	35.7%	20.0%	25.0%	25.0%	43.8%	16.7%	25.0%	33.3%	50.0%	33.3%	25.0%	0.0%	33.3%	33.3%
***t* Test**	-2.343 [b]	-2.022 [c]	0.216	-1.577	-2.373 [b]	-2.193 [b]	0.37	-3.215 [b]	-1.365	-0.71	0.373	-0.317	-0.402	-2.331 [c]	0.57	-0.281
(p-value)	(0.027)	(0.054)	(0.831)	(0.127)	(0.025)	(0.037)	(0.715)	(0.004)	(0.221)	(0.505)	(0.722)	(0.762)	(0.702)	(0.059)	(0.589)	(0.788)
Sign Test	19 [c]	16	14	15	17	17	14	21 [a]	5	4	4	4	4	7 [b]	4	4
(p-value)	(0.052)	(0.442)	(1.000)	(0.701)	(0.248)	(0.248)	(1.000)	(0.006)	(0.453)	(1.000)	(1.000)	(1.000)	(1.000)	(0.016)	(1.000)	(1.000)
Signed Rank Test	2.559 [b]	1.381	0.372	1.093	2.126 [b]	1.814 [c]	-0.012	2.943 [a]	1.268	0.592	0.085	0.254	0.085	2.282 [b]	0.254	0.254
(p-value)	(0.011)	(0.167)	(0.710)	(0.274)	(0.034)	(0.070)	(0.990)	(0.003)	(0.205)	(0.554)	(0.933)	(0.800)	(0.933)	(0.023)	(0.800)	(0.800)
(2) Estimated for every firm i by OLS (Ordinary Least Squared)																
Mean	-0.001	-0.001	0.002	-0.003	-0.211	-0.155	0.363	-0.361	-0.003	-0.001	0.000	-0.002	-0.062	-0.232	0.205	-0.068
Median	-0.001	0.000	-0.001	0.000	-0.145	-0.017	0.099	-0.257	-0.005	-0.001	-0.002	-0.003	-0.040	-0.137	0.188	-0.215
STD	0.004	0.004	0.028	0.009	0.476	0.356	1.847	0.533	0.005	0.003	0.011	0.006	0.527	0.287	1.043	0.567
% significance*	22.2%	25.9%	74.1%	48.1%	40.7%	40.7%	63.0%	51.9%	57.1%	28.6%	71.4%	42.9%	42.9%	28.6%	85.7%	42.9%
% positive**	50.0%	42.9%	40.0%	30.8%	9.1%	18.2%	47.1%	14.3%	25.0%	0.0%	40.0%	33.3%	0.0%	0.0%	50.0%	33.3%
***t* Test**	-1.776 [c]	-1.919 [c]	0.398	-1.546	-2.307 [b]	-2.262 [b]	1.021	-3.524 [a]	-1.769	-1.342	0.04	-0.715	-0.314	-2.136 [c]	0.519	-0.316
(p-value)	(0.088)	(0.066)	(0.694)	(0.134)	(0.029)	(0.032)	(0.317)	(0.002)	(0.127)	(0.228)	(0.969)	(0.502)	(0.764)	(0.077)	(0.622)	(0.763)
Sign Test	18	16	14	15	16	15	16	20 [b]	5	4	5	5	4	6	4	4
(p-value)	(0.122)	(0.442)	(1.000)	(0.701)	(0.442)	(0.701)	(0.442)	(0.019)	(0.453)	(1.000)	(0.453)	(0.453)	(1.000)	(0.125)	(1.000)	(1.000)
Signed Rank Test	2.03 [b]	1.502	0.517	1.237	2.078 [b]	1.694 [c]	0.42	3.087 [a]	1.775 [c]	1.099	0.592	0.592	0.254	1.775 [c]	0.254	0.423
(p-value)	(0.042)	(0.133)	(0.606)	(0.216)	(0.038)	(0.090)	(0.674)	(0.002)	(0.076)	(0.272)	(0.554)	(0.554)	(0.800)	(0.076)	(0.800)	(0.673)

See Table 2 note.

Table 4.

Summaries of results from tests to investigate hypotheses that a rating change corresponds to changes in the firm's return distribution and systematic risk. For each rating downgrade in the sample, equation (2) was estimated using data from days -115 through +15.

$$R_{it} = \alpha_i + \beta_i R_{mt} + \gamma_{s,i} D_{s,t} + \lambda_{s,i} D_{s,t} R_{mt} + u_{it}$$

where R_{it} is the return on stock i at time t; R_{mt} is the return on the market at time t; $D_{s,t}$ is a dummy variable taking on the value of one for the days in the event window s and zero otherwise.

	Panel A: whole sample (N=33)								**Panel B: non-contaminated sample (N=28)**							
	CAR: $\gamma_{s,i}$				**CCB: $\lambda_{s,i}$**				**CAR: $\gamma_{s,i}$**				**CCB: $\lambda_{s,i}$**			
Event window s	**(0,15)**	**(-15,15)**	**(-1,1)**	**(-5,5)**	**(0,15)**	**(-15,15)**	**(-1,1)**	**(-5,5)**	**(0,15)**	**(-15,15)**	**(-1,1)**	**(-5,5)**	**(0,15)**	**(-15,15)**	**(-1,1)**	**(-5,5)**
(1) Estimated for every firm *i* by GLS (Generalized Least Squares)																
Mean	-0.001	-0.001	-0.004	-0.001	-0.312	-0.249	-0.032	-0.284	-0.001	0.000	0.000	0.000	-0.268	-0.184	-0.010	-0.237
Median	-0.001	0.000	0.001	-0.001	-0.224	-0.128	-0.179	-0.319	-0.001	0.000	0.000	-0.001	-0.204	-0.175	-0.133	-0.270
STD	0.006	0.006	0.031	0.008	0.543	0.569	2.469	0.579	0.005	0.004	0.027	0.006	0.477	0.359	2.662	0.595
% significance*	30.3%	24.2%	63.6%	18.2%	51.5%	45.5%	60.6%	45.5%	28.6%	17.9%	64.3%	21.4%	46.4%	42.9%	60.7%	46.4%
% positive**	50.0%	62.5%	52.4%	66.7%	23.5%	13.3%	30.0%	13.3%	37.5%	80.0%	50.0%	66.7%	23.1%	8.3%	35.3%	15.4%
***t* Test**	-1.404	-1.016	-0.719	-0.775	-3.298 [a]	-2.516 [b]	-0.075	-2.819 [a]	-1.242	-0.046	-0.095	-0.021	-2.977 [a]	-2.703 [b]	-0.019	-2.105 [b]
(p-value)	(0.170)	(0.317)	(0.477)	(0.444)	(0.002)	(0.017)	(0.941)	(0.008)	(0.225)	(0.964)	(0.925)	(0.984)	(0.006)	(0.012)	(0.985)	(0.045)
Sign Test	21	17	17	17	26 [a]	20	20	24 [b]	18	15	14	15	22 [a]	17	16	19 [c]
(p-value)	(0.163)	(1.000)	(1.000)	(1.000)	(0.001)	(0.296)	(0.296)	(0.014)	(0.185)	(0.851)	(1.000)	(0.851)	(0.004)	(0.345)	(0.572)	(0.087)
Signed Rank Test	1.483	0.232	0.375	0.768	3.020 [a]	2.233 [b]	0.536	2.859 [a]	1.309	0.216	0.125	0.558	2.789 [a]	2.084 [b]	0.307	2.289 [b]
(p-value)	(0.138)	(0.816)	(0.708)	(0.442)	(0.003)	(0.026)	(0.592)	(0.004)	(0.190)	(0.829)	(0.900)	(0.577)	(0.005)	(0.037)	(0.759)	(0.022)
(2) Panel b: Estimated for every firm *i* by OLS (Ordinary Least Squared)																
Mean	-0.001	-0.001	-0.002	-0.003	-0.311	-0.290	-0.176	-0.298	-0.001	-0.001	0.002	-0.002	-0.248	-0.184	-0.209	-0.223
Median	-0.001	0.000	0.001	-0.001	-0.194	-0.155	-0.125	-0.287	-0.001	0.000	0.000	-0.001	-0.186	-0.147	-0.068	-0.240
STD	0.005	0.006	0.030	0.010	0.577	0.663	2.267	0.603	0.004	0.004	0.024	0.008	0.496	0.436	2.389	0.605
% significance*	18.2%	18.2%	75.8%	42.4%	45.5%	48.5%	81.8%	48.5%	17.9%	14.3%	71.4%	39.3%	39.3%	50.0%	82.1%	46.4%
% positive**	66.7%	50.0%	60.0%	50.0%	20.0%	18.8%	40.7%	12.5%	60.0%	50.0%	60.0%	54.5%	18.2%	21.4%	43.5%	15.4%
***t* Test**	-1.029	-1.451	-0.378	-1.569	-3.096 [a]	-2.511 [b]	-0.445	-2.836 [a]	-0.834	-0.947	0.424	-1.032	-2.650 [b]	-2.234 [b]	-0.462	-1.949 [c]
(p-value)	(0.311)	(0.157)	(0.708)	(0.127)	(0.004)	(0.017)	(0.659)	(0.008)	(0.412)	(0.352)	(0.675)	(0.311)	(0.013)	(0.034)	(0.648)	(0.062)
Sign Test	20	20	17	19	24 [b]	21	20	22 [c]	17	16	14	16	21 [b]	18	16	17
(p-value)	(0.296)	(0.296)	(1.000)	(0.487)	(0.014)	(0.163)	(0.296)	(0.080)	(0.345)	(0.572)	(1.000)	(0.572)	(0.013)	(0.185)	(0.572)	(0.345)
Signed Rank Test	1.072	0.804	0.125	1.036	2.841 [a]	2.519 [b]	0.750	2.555 [b]	0.945	0.330	0.399	0.786	2.630 [b]	2.084	0.535	1.742
(p-value)	(0.284)	(0.421)	(0.901)	(0.300)	(0.005)	(0.012)	(0.453)	(0.011)	(0.345)	(0.572)	(1.000)	(0.572)	(0.013)	(0.185)	(0.572)	(0.345)

See Table 2 note.

Table 5.

Summaries of results from tests to investigate hypotheses that a rating change corresponds to changes in the firm's return distribution and systematic risk. For each rating downgrade in the sample, equation (2) was estimated using data from days -115 through +15.

$$R_{it} = \alpha_i + \beta_i R_{mt} + \gamma_{s,i} D_{s,t} + \lambda_{s,i} D_{s,t} R_{mt} + u_{it}$$

where R_{it} is the return on stock i at time t; R_{mt} is the return on the market at time t; $D_{s,t}$ is a dummy variable taking on the value of one for the days in the event window s and zero otherwise.

	Panel A: financial sample (N=27)								**Panel B: non-financial sample (N=7)**							
	CAR: $\gamma_{s,i}$				**CCB: $\lambda_{s,i}$**				**CAR: $\gamma_{s,i}$**				**CCB: $\lambda_{s,i}$**			
Event window s	**(0,15)**	**(-15,15)**	**(-1,1)**	**(-5,5)**	**(0,15)**	**(-15,15)**	**(-1,1)**	**(-5,5)**	**(0,15)**	**(-15,15)**	**(-1,1)**	**(-5,5)**	**(0,15)**	**(-15,15)**	**(-1,1)**	**(-5,5)**
(1) Estimated for every firm i by GLS (Generalized Least Squares)																
Mean	-0.001	-0.001	-0.004	-0.001	-0.403	-0.317	-0.238	-0.271	-0.002	-0.001	-0.003	-0.001	-0.215	-0.178	0.186	-0.299
Median	-0.001	0.000	0.002	-0.002	-0.235	-0.034	-0.224	-0.326	-0.002	0.000	-0.004	0.000	-0.174	-0.239	-0.117	-0.256
STD	0.005	0.007	0.039	0.009	0.595	0.705	2.876	0.575	0.006	0.005	0.022	0.008	0.482	0.388	2.020	0.601
% significance*	23.5%	11.8%	52.9%	17.6%	47.1%	35.3%	52.9%	41.2%	37.5%	37.5%	75.0%	18.8%	56.3%	56.3%	68.8%	50.0%
**% positive ** **	75.0%	50.0%	55.6%	66.7%	25.0%	16.7%	11.1%	14.3%	33.3%	66.7%	50.0%	66.7%	22.2%	11.1%	45.5%	12.5%
***t* Test**	-0.780	-0.663	-0.464	-0.612	-2.793 [b]	-1.851 [c]	-0.341	-1.939 [c]	-1.156	-0.783	-0.629	-0.459	-1.784 [c]	-1.837 [c]	0.368	-1.986 [c]
(p-value)	(0.447)	(0.517)	(0.649)	(0.549)	(0.013)	(0.083)	(0.738)	(0.070)	(0.266)	(0.446)	(0.539)	(0.653)	(0.095)	(0.086)	(0.718)	(0.066)
Sign Test	10	9	10	9	14 [b]	11	10	12	11	8	9	8	12 [c]	9	10	12 [c]
(p-value)	(0.629)	(1.000)	(0.629)	(1.000)	(0.013)	(0.332)	(0.629)	(0.144)	(0.210)	(1.000)	(0.804)	(1.000)	(0.077)	(0.804)	(0.455)	(0.077)
Signed Rank Test	0.757	0.000	0.047	0.757	2.556 [b]	1.657 [c]	0.521	1.941 [c]	1.422	0.440	0.336	0.284	1.732 [c]	1.525	0.181	2.094 [c]
(p-value)	(0.449)	(1.000)	(0.962)	(0.449)	(0.011)	(0.098)	(0.603)	(0.052)	(0.155)	(0.660)	(0.737)	(0.776)	(0.083)	(0.127)	(0.856)	(0.036)
(2) Estimated for every firm i by OLS (Ordinary Least Squared)																
Mean	-0.001	-0.002	0.000	-0.003	-0.431	-0.389	-0.512	-0.290	-0.001	-0.001	-0.004	-0.002	-0.183	-0.185	0.181	-0.306
Median	-0.001	0.000	0.001	-0.001	-0.194	-0.139	-0.336	-0.280	-0.001	0.000	-0.003	-0.001	-0.196	-0.190	-0.077	-0.298
STD	0.005	0.007	0.036	0.011	0.605	0.820	2.471	0.588	0.005	0.005	0.022	0.009	0.535	0.445	2.047	0.637
% significance*	11.8%	23.5%	70.6%	41.2%	47.1%	41.2%	82.4%	47.1%	25.0%	12.5%	81.3%	43.8%	43.8%	56.3%	81.3%	50.0%
**% positive ** **	100.0%	50.0%	75.0%	57.1%	12.5%	14.3%	28.6%	0.0%	50.0%	50.0%	46.2%	42.9%	28.6%	22.2%	53.8%	25.0%
***t* Test**	-0.573	-0.923	-0.057	-1.168	-2.938 [b]	-1.955 [c]	-0.854	-2.033 [c]	-0.869	-1.189	-0.638	-1.018	-1.371	-1.661	0.355	-1.919 [c]
(p-value)	(0.575)	(0.370)	(0.956)	(0.260)	(0.010)	(0.068)	(0.406)	(0.059)	(0.399)	(0.253)	(0.533)	(0.325)	(0.191)	(0.118)	(0.728)	(0.074)
Sign Test	10	11	10	10	13 [b]	10	11	10	10	9	9	9	11	11	9	12 [c]
(p-value)	(0.629)	(0.332)	(0.629)	(0.629)	(0.049)	(0.629)	(0.332)	(0.629)	(0.455)	(0.804)	(0.804)	(0.804)	(0.210)	(0.210)	(0.804)	(0.077)
Signed Rank Test	0.284	0.284	0.568	0.899	2.556 [b]	1.657 [c]	1.089	1.657 [c]	1.215	0.957	0.336	0.646	1.370	1.629	0.026	1.887 [c]
(p-value)	(0.776)	(0.776)	(0.570)	(0.368)	(0.011)	(0.098)	(0.276)	(0.098)	(0.224)	(0.339)	(0.737)	(0.518)	(0.171)	(0.103)	(0.979)	(0.059)

See Table 2 note.

Table 6.

Summaries of results from tests to investigate hypotheses that a rating change corresponds to changes in the firm's return distribution and systematic risk. For each rating downgrade in the sample, equation (2) was estimated using data from days -115 through +15.

$$R_{it} = \alpha_i + \beta_i R_{mt} + \gamma_{s,i} D_{s,t} + \lambda_{s,i} D_{s,t} R_{mt} + u_{it}$$

where R_{it} is the return on stock i at time t; R_{mt} is the return on the market at time t; $D_{s,t}$ is a dummy variable taking on the value of one for the days in the event window s and zero otherwise.

	Panel A: external reasons sample (N=15)								**Panel B: internal reasons sample (N=18)**							
	CAR: $\gamma_{s,i}$				**CCB: $\lambda_{s,i}$**				**CAR: $\gamma_{s,i}$**				**CCB: $\lambda_{s,i}$**			
Event window s	**(0,15)**	**(-15,15)**	**(-1,1)**	**(-5,5)**	**(0,15)**	**(-15,15)**	**(-1,1)**	**(-5,5)**	**(0,15)**	**(-15,15)**	**(-1,1)**	**(-5,5)**	**(0,15)**	**(-15,15)**	**(-1,1)**	**(-5,5)**
(1) Estimated for every firm i by GLS (Generalized Least Squares)																
Mean	-0.002	-0.002	-0.002	-0.003	-0.334	-0.310	-0.531	-0.278	-0.001	0.000	-0.006	0.001	-0.293	-0.199	0.383	-0.289
Median	-0.002	0.000	0.004	-0.002	-0.164	-0.014	-0.086	-0.220	-0.001	-0.001	-0.002	0.001	-0.276	-0.175	-0.374	-0.350
STD	0.005	0.008	0.040	0.009	0.611	0.751	2.543	0.494	0.006	0.004	0.022	0.007	0.497	0.375	2.397	0.656
% significance*	33.3%	26.7%	66.7%	13.3%	40.0%	53.3%	53.3%	33.3%	27.8%	22.2%	61.1%	22.2%	61.1%	38.9%	66.7%	55.6%
% positive**	40.0%	50.0%	60.0%	100.0%	16.7%	12.5%	37.5%	20.0%	60.0%	75.0%	45.5%	50.0%	27.3%	14.3%	25.0%	10.0%
***t* Test**	-1.689	-1.022	-0.151	-1.383	-2.116 [c]	-1.600	-0.809	-2.183 [b]	-0.546	-0.263	-1.140	0.432	-2.505 [b]	-2.252 [b]	0.678	-1.869 [c]
(p-value)	(0.113)	(0.324)	(0.882)	(0.188)	(0.053)	(0.132)	(0.432)	(0.047)	(0.592)	(0.796)	(0.270)	(0.671)	(0.023)	(0.038)	(0.507)	(0.079)
Sign Test	10	9	9	9	13 [a]	9	9	12 [b]	11	10	10	10	13 [c]	11	11	12
(p-value)	(0.302)	(0.607)	(0.607)	(0.607)	(0.007)	(0.607)	(0.607)	(0.035)	(0.481)	(0.815)	(0.815)	(0.815)	(0.096)	(0.481)	(0.481)	(0.238)
Signed Rank Test	1.448	0.142	-0.028	0.994	2.187 [b]	1.278	0.312	2.357 [b]	0.653	0.261	0.697	0.131	2.221 [b]	1.829 [c]	0.348	1.829 [c]
(p-value)	(0.148)	(0.887)	(0.977)	(0.320)	(0.029)	(0.201)	(0.755)	(0.018)	(0.514)	(0.794)	(0.486)	(0.896)	(0.026)	(0.067)	(0.728)	(0.067)
(2) Estimated for every firm i by OLS (Ordinary Least Squared)																
Mean	-0.001	-0.002	-0.001	-0.005	-0.305	-0.308	-0.427	-0.255	0.000	-0.001	-0.003	-0.001	-0.316	-0.275	0.034	-0.333
Median	-0.001	0.000	0.003	-0.002	-0.118	-0.116	-0.088	-0.287	-0.001	0.000	-0.001	0.000	-0.233	-0.253	-0.437	-0.241
STD	0.005	0.007	0.041	0.012	0.648	0.858	2.629	0.538	0.005	0.004	0.017	0.007	0.530	0.470	1.971	0.665
% significance*	26.7%	20.0%	86.7%	53.3%	33.3%	53.3%	73.3%	40.0%	11.1%	16.7%	66.7%	33.3%	55.6%	44.4%	88.9%	55.6%
% positive**	50.0%	33.3%	61.5%	50.0%	20.0%	25.0%	45.5%	16.7%	100.0%	66.7%	58.3%	50.0%	20.0%	12.5%	37.5%	10.0%
***t* Test**	-1.095	-1.302	-0.121	-1.682	-1.826 [c]	-1.390	-0.629	-1.838 [c]	-0.375	-0.642	-0.629	-0.334	-2.525 [b]	-2.480 [b]	0.072	-2.122 [b]
(p-value)	(0.292)	(0.214)	(0.905)	(0.115)	(0.089)	(0.186)	(0.540)	(0.087)	(0.712)	(0.529)	(0.537)	(0.743)	(0.022)	(0.024)	(0.943)	(0.049)
Sign Test	10	8	9	10	11	8	9	10	10	12	10	9	13 [c]	13 [c]	11	12
(p-value)	(0.302)	(1.000)	(0.607)	(0.302)	(0.119)	(1.000)	(0.607)	(0.302)	(0.815)	(0.238)	(0.815)	(1.000)	(0.096)	(0.096)	(0.481)	(0.238)
Signed Rank Test	0.880	0.426	0.540	1.335	1.903	1.164	0.426	1.732	0.697	0.697	0.261	0.174	2.178 [b]	2.265 [b]	0.784	1.698 [c]
(p-value)	(0.379)	(0.670)	(0.590)	(0.182)	(0.057)	(0.244)	(0.670)	(0.083)	(0.486)	(0.486)	(0.794)	(0.862)	(0.029)	(0.024)	(0.433)	(0.089)

See Table 2 note.

Table 7.

Summaries of results from tests to investigate hypotheses that a rating change corresponds to changes in the firm's return distribution and systematic risk. The estimated Seemingly Unrelated Regression (SUR) is:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \sum_{s=1}^{3} \gamma_s D_{st} + \sum_{s=1}^{3} \lambda_s D_{st} R_{mt} + u_{it}, \qquad i = 1,\ldots,N$$

where R_{it} is the return on stock i at time t; R_{mt} is the return on the market at time t; $D_{s,t}$ is a dummy variable:

$$D_{1t} = \begin{cases} 1 & t \in (-15,-2) \\ 0 & t \notin (-15,-2) \end{cases}; \quad D_{2t} = \begin{cases} 1 & t \in (-1,1) \\ 0 & t \notin (-1,1) \end{cases}; \quad D_{3t} = \begin{cases} 1 & t \in (2,15) \\ 0 & t \notin (2,15) \end{cases}$$

	pre-event window		**event window**		**post-event window**	
	γ_1	λ_1	γ_2	λ_2	γ_3	λ_3
Panel A: rating upgrade						
whole sample (N=34)	-0.013	-0.099 [a]	-0.158 [b]	0.003	-0.033	-0.076 [b]
(p-value)	(0.729)	(0.000)	(0.045)	(0.961)	(0.390)	(0.027)
non-contaminated sample (N=31)	0.007	-0.112 [a]	-0.130	0.015	-0.053	-0.111 [b]
(p-value)	(0.870)	(0.008)	(0.142)	(0.884)	(0.215)	(0.024)
financial sample (N=27)	-0.010	-0.084 [a]	-0.208 [b]	-0.038	-0.011	-0.084 [b]
(p-value)	(0.794)	(0.003)	(0.014)	(0.616)	(0.788)	(0.022)
non-financial sample (N=7)	0.044	-0.255 [b]	0.066	-0.056	-0.216	0.009
(p-value)	(0.755)	(0.024)	(0.832)	(0.800)	(0.133)	(0.935)
Panel B: rating downgrade						
whole sample (N=33)	-0.057	-0.224 [a]	0.205	-0.461 [a]	-0.019	-0.255 [a]
(p-value)	(0.384)	(0.000)	(0.145)	(0.000)	(0.777)	(0.000)
non-contaminated sample (N=28)	-0.044	-0.170 [a]	0.207	-0.305 [b]	-0.026	-0.168 [a]
(p-value)	(0.500)	(0.001)	(0.147)	(0.012)	(0.692)	(0.002)
financial sample (N=17)	-0.028	-0.239 [a]	0.328	-0.769 [a]	0.014	-0.337 [a]
(p-value)	(0.765)	(0.003)	(0.115)	(0.000)	(0.882)	(0.000)
non-financial sample (N=16)	-0.009	-0.198 [a]	-0.027	-0.115	-0.051	-0.181 [a]
(p-value)	(0.931)	(0.003)	(0.905)	(0.467)	(0.639)	(0.009)
external reasons sample (N=15)	-0.038	-0.165 [b]	0.048	-0.383 [b]	0.011	-0.280 [a]
(p-value)	(0.743)	(0.021)	(0.844)	(0.021)	(0.924)	(0.000)
internal reasons sample (N=18)	-0.034	-0.249 [a]	0.333	-0.534 [a]	-0.047	-0.169 [b]
(p-value)	(0.686)	(0.000)	(0.068)	(0.000)	(0.585)	(0.016)

a, b and c denote statistical significance at the 1%, 5% and 10% level respectively.