A Study of Rating Changes in Firms at the Margin of Investment and Speculative Grades[*]

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December 2010

[*] We thank Michael Ginzberg, Suresh Govindaraj, Bharat Sarath, and M. Thenmozhi, and seminar participants at IIT Madras, for providing useful comments and raising important questions. Sungsoo Kim thanks Rutgers University; Murgie Krishnan and Joseph Kerstein, to Yeshiva University, for financial support.

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It is at the margin of investment grade and speculative grade where a small change in a credit rating may have the largest impact on a firmôs financing and investing opportunities. We initially find in our univariate tests that marginal investment grade firms are downgraded one tier less often and marginal speculative grade firms are upgraded one tier more often than other comparable firms. These differences persist after controlling for firms at the margin improving profitability and reducing debt. Our findings are consistent with firms at the margin reducing unobservable risk factors and/or benefitting from coddling by the rating agency.

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Credit rating agencies such as S&P confer ratings on firms that can be generally classified as investment or speculative grades, where the differences between those two categories can greatly affect the firmôs ability to borrow and expand or maintain its operations. Under the S&P classification scheme, the lowest tier within the investment grade is BBB- and the highest tier within the speculative grade is BB+.[1] It is at the margin of investment grade and speculative grade where a small change in a credit rating has the largest potential impact on an investorôs perception and behavior, and the firmôs opportunities. For example, pension funds and financial institutions often face formal restrictions from investing in speculative graded instruments while smaller investors may also use the distinction between investment and speculative grade to screen their choices. Being at the margin of speculative and investment grade would also likely put managers under the spotlight from both shareholders and bondholders. It therefore seems natural to expect that investment and speculative grade firms at the margin (BBB- and BB+ firms) have stronger incentives than comparable firms to, respectively, avoid a one-tier downgrade or get a one-tier upgrade.

Previous literature has tended to analyze the separation between investment grade and speculative grade by grouping together the various tiers of investment grade and speculative grade firms where the pressures to make significant economic changes or coddle may not be uniformly the same. Our study focuses particularly on near-term one-tier ratings changes. We examine economic choices by firms at the margin of investment and speculative grade in

[1] Throughout this paper we use the term ñgradeò to denote broad rating categories such as investment grade and speculative grade. For sub-categories incorporating plus or minus notches, like BBB- or BB+, we use the term ñtier.ò So the investment grade consists of several tiers (from AAA to BBB-), with BBB- being the tier at the margin of investment and speculative grades.

comparison to other firms in the same broad ratings category. We anticipate that firms at the margin are more likely to make economic changes favorable to their ratings status such as improving operating performance, reducing leverage, and/or increasing size (e.g., through mergers with firms having better financing risks and/or expanding using positive NPV projects). However, we also consider the possibility that marginal firms may be more likely to achieve favorable ratings outcomes by offering higher fees and/or making stronger commitments for future business.

Given the competition among ratings agencies for business, credit agencies face a tradeoff between coddling paying firms who seek a higher rating or wish to avoid a lower rating, and being conservative to ensure their own long-term reputation among investors. Smaller ratings changes of the kind focused on in this work have the most scope for ambiguity, discretion, and negotiation whereas larger changes are more likely to be accompanied by dramatic events that are associated with more information in the public domain. Recent concerns in the popular press suggest that rating agencies are too generous in their ratings in response to client pressure. For example (ñS&P draws criticism as sets ratings reform,ò Reuters, 2/7/08), in response to widespread criticism about conflicts of interest, S&P indicated a willingness to appoint an ombudsman to look at potential conflicts of interest among its analysts, and to hire an outside firm to review compliance and governance processes. It also indicated that it would periodically rotate analysts to ensure they remain independent in both appearance and fact to the companies they rate. But if coddling client firms in the short run is the only goal of a rating agency its decision problem would be simple, i.e., it would simply assign investment grade ratings to all. A rating agency needs to be concerned with its long-term reputation for its own sake and for that of its clients. If it loses the trust of investors, its ratings would lose their

credibility and value altogether. See Covitz and Harrison (2003) for a lucid discussion of conflicting incentives that rating agencies face. A simple tabulation of the numbers of investment grade and speculative grade firms from 1986 to 2001 in Kisgen (2006, Table I) indicates that approximately one-third of the firms having credit ratings reported in Compustat receive a speculative grade rating. So there is more to a rating agencyôs behavior than simply coddling its clients.

How would an agency actually implement a coddling strategy? In a setting in which rating agencies are also privy to significant private information, this strategy need not necessarily involve outright lying about a client firmôs condition. It can be sufficient for a rating agency to be selective about what pieces of private evidence it chooses to make public (Shin 1994). Suppression of negative information is harder for a wider public to detect. Investors, regulators, and other credit rating agencies cannot easily tell if a rating agency is silent because it has suppressed private evidence of bad news, or because it has no private information at all. Whether a professional athleteôs declining or improving performance in the short term is an aberration or is systematic is hard to tell if recent medical information relevant to that performance is not revealed. The cost of hiding negative private information is potentially less than the cost of manufacturing unjustifiably positive information, as the latter could be easier for the general public or financial press to challenge. And suppressing negative information may be enough to show a client firm in a significantly better light.

Given that firms at the margin of speculative and investment grades have greater incentives and are more likely to experience a higher rate of favorable ratings outcomes as described above, a primary issue is by what means they do so. On the one hand, if the credit rating agencies have an overriding concern over their long-term reputation and do not coddle,

then firms at the margin of investment and speculative grade have little choice but to influence critical risk factors, i.e., improve operating performance, reduce leverage, and/or increase size. This implies that favorable ratings changes at the margin are more likely to be explained by increased tendencies to improve critical risk factors. Alternatively, if the agencies are not opposed to coddling in return for higher fees and/or future commitments of business and provide a viable option to firms less costly than other economic choices, then favorable ratings changes at the margin may not be associated with improvements in critical risk factors.

As expected, we find in our univariate tests that marginal investment grade firms are downgraded one tier less often and marginal speculative grade firms are upgraded one tier more often than comparable firms. Our multivariate tests then indicate that while improving operating performance, reducing leverage and/or expanding size have an overall and predictable effect on ratings changes, there is little evidence that such improvements by firms at the margin explain the differences in favorable ratings outcomes found in the univariate tests. We considered several alternative measures of standard risk factors in our sensitivity tests and found that our results are robust. For example, we used various measures of operating performance other than net income, including net income before extraordinary items, operating income before depreciation, cash flow from operations and EBITDA, and our conclusions remain unchanged. In the absence of finding that fundamental risk factors explain the abnormal favorable ratings outcomes by firms at the margin of speculative and investment grade, this suggests that such firms apparently benefit from either a reduction of unobservable risk factors and/or from coddling by the rating agency. This is consistent with recent evidence in the public domain that has suggested the possibility that the agencies coddle to their clients, though there has been little research demonstrating coddling on the part of the rating agencies.

The plan of the rest of the paper is as follows. Section 1 summarizes previous work. In Section 2 we discuss our empirical models. Section 3 describes the data and Section 4 presents our main results. We state our conclusions in Section 5.

1. Related Literature

Earlier empirical studies of credit ratings considered determinants of corporate bond ratings (e.g., Horrigan (1966), Kaplan and Urwitz (1979), Edderington (1985) and Ziebart and Reiter (1992)). The vast majority find that size, profitability and leverage are the most significant determinants of corporate bond ratings. Accordingly they are also the primary determinants that we rely on in our study. We also control for industry and year, since it is plausible that factors common to all firms in an industry (e.g. terrorism affecting airline traffic generally) or in a year (e.g. major financial crisis affecting credit availability generally) could also differentially affect credit ratings depending on which industries are represented in the different ratings at different points in time.

Prior empirical studies of credit ratings also focused on ratings as an independent variable in explaining cross-sectional differences in yield spreads (West (1973), Liu and Thakor (1984), and Ederington, Yawitz, and Roberts (1987)). These findings indicate that ratings are correlated with bond yields, which supports the idea that bond markets view credit rating agencies as credible disseminators of information about the underlying risk of bonds. However, other studies raised questions about the information content of rating decisions. There was little or no stock price reaction to upgrades but there was a negative stock price reaction to downgrades (Weinstein (1977), Holthausen and Leftwich (1986), Ederington and Yawitz (1987), Hand, Holthausen and Leftwich (1992), Goh and Ederington (1993)). Boot et al. (2006) acknowledge

the negotiation that is possible between agency and client, and note that implicit contracting is more likely to occur in downgrade than upgrade situations as credit rating agencies set up conditions for firms to avoid downgrades. Kisgen (2006) documents that firms at the margin tend to influence one risk factor, debt structure, to maintain or improve their rating. Kisgenôs findings point to the possibility that firms at the margin choose to reduce leverage as a main strategy for improving ratings outcomes rather than relying on coddling by the agencies.

Our research differs from prior research by explicitly considering the role of moral hazard by the rating agency as a factor that may influence bond rating changes at the margin of speculative and investment grades, while also examining the role that changing risk factors play at the margin. Covitz and Harrison (2003) also consider moral hazard problems on the part of the rating agency. However, they do not focus on the economic choices by firms at the margin of speculative and investment grade and consider only downgrades. They measure delay as ñthe degree to which ratings changes are anticipated by the bond market, where anticipation is defined as the ratio of an issuerôs bond-yield-spread change over the five months preceding the month of the rating change to the total spread change over those five months plus the month of the rating change itself.ò They find evidence consistent with rating agencies protecting their reputations with timely actions in cases likely to have generated substantial publicity. Their results are subject to the caveat that when the bond market does not anticipate any deterioration in credit quality because of information asymmetry, the computed measure of delay by the rating agency will record no-delay when in fact there is delay. The authors note, for example, that given information asymmetry their tests may ñfail to detect conflicts of interest that manifest in favored clients not being downgraded at all.ò

2. Empirical models

The empirical work is presented as follows. In Table 1 we summarize the frequencies of different ratings changes for firms in different tiers in the broad BB and BBB categories. The finding in this table motivates the primary question: why are firms at the margin more likely to experience favorable ratings outcomes? In Tables 2 and 3 we present the results of our univariate tests. The main multivariate analyses are shown in Tables 4 and 5.

This section discusses the main empirical models tested in Tables 4 and 5. All the regressions in Table 4 use a dependent variable DOWN11 which tells us whether a firm experienced a 1-tier downgrade between time periods t and t+1 (coded 1) or had no changes (coded 0). We focus on the broad ratings category BBB, which includes investment grade firms at the margin of speculative grade BBB- and two adjacent tiers within the investment grade BBB and BBB+.

The first specified model is our primary benchmark. In this specification we do not isolate the effects associated with respect to investment grade firms at the margin of speculative grades versus the other two tiers within the same broad ratings category. We initially evaluate how much risk factor levels and risk factor changes can explain one-tier downgrades by firms in the broad ratings category BBB. We control for well-documented and publicly available risk factors governing credit ratings: ROA (net income to total assets, LEV (debt to equity), SIZE (log of total assets). For each rating tier there are likely to be different levels for these variables, so we use corresponding dummies (LOWROA, SMALL and HIGHLEV) that are coded 1 if the variable values fall in the extreme quintile suggested by the variable name (and otherwise coded 0). We do this to identify cases within each ratings tier that are more likely to be downgraded. We also look at relative changes to these factors between t and t+1: INCRROA is coded 1 when

firms have an increase in profitability (and otherwise coded 0); LESSLEV is coded 1 for a decrease in the total of short- and long-term debt relative to changes in stockholderôs equity (and otherwise coded 0); and INCRSIZE is coded 1 for an increase in firmôs total assets (and otherwise is coded 0). To capture common industry and period effects we include Fama-French (1997) industry factor dummies (X_j) and year dummies (W_k). Denoting u_i as the residuals governed by the logistic distribution, the model that we estimate in Specification 1 is given by

$$\begin{aligned} \text{DOWN11}_i = \alpha &+ \beta_1 \text{LOWROA}_i + \beta_2 \text{HIGHLEV}_i + \beta_3 \text{SMALL}_i \\ &+ \beta_4 \text{INCRROA}_i + \beta_5 \text{LESSLEV}_i + \beta_6 \text{INCRSIZE}_i \\ &+ \sum_j X_{ji} + \sum_k W_{ki} + u_i \end{aligned} \qquad (1)$$

If firm actions to improve ratings are important, we anticipate that β_1 to β_3 will be positive, while coefficients β_4 to β_6 will be negative.

The next two specifications use a dummy variable MARGINAL_I to compare investment grade firms at the margin (BBB- firms, MARGINAL_I coded 1) and other firms in the same broad ratings category (BBB and BBB+ firms, MARGINAL_I coded 0). The second model specification incorporates the interaction terms between MARGINAL_I and each of the time t risk factors, denoted LOWROAX, HIGHLEVX, and SMALLX, and each change in the risk factors indicated by INCRROAX, LESSLEVX, and INCRSIZEX. The corresponding model is given by:

$$\begin{aligned} \text{DOWN11}_i = \alpha &+ \beta_1 \text{LOWROA}_i + \beta_2 \text{HIGHLEV}_i + \beta_3 \text{SMALL}_i + \beta_4 \text{INCRROA}_i + \beta_5 \text{LESSLEV}_i + \beta_6 \text{INCRSIZE}_i \\ &+ \beta_7 \text{LOWROAX}_i + \beta_8 \text{HIGHLEVX}_i + \beta_9 \text{SMALLX}_i + \beta_{10} \text{INCRROAX}_i + \beta_{11} \text{LESSLEVX}_i + \beta_{12} \text{INCRSIZEX}_i \\ &+ \sum_j X_{ji} + \sum_k W_{ki} + u_i \end{aligned} \qquad (2)$$

We anticipate few differences in the treatment by the ratings agencies of firms at the margin versus other firms with respect to these time t risk factors consistent with the agencies being even-handed with respect to common and well-known risk factors. This suggests that β_7 to

β_9 are all zero. On the other hand, in the subsequent period when the rating change occurs, we anticipate that firms at the margin have lower likelihoods of one-tier downgrades that can be attributed to their increased incentives with respect to one-tier downgrades to reduce risk factors. This implies that the coefficients on INCRROAX, LESSLEVX, and INCRSIZEX, β_{10} to $\beta_{12,}$ are all negative.

In the third specified model in Table 4, we examine the effect of MARGINAL_I itself given the other variables in the model. The resulting model is given by:

$$\begin{aligned} \text{DOWN11}_i = {} & \alpha + \beta_1 \text{LOWROA}_i + \beta_2 \text{HIGHLEV}_i + \beta_3 \text{SMALL}_i + \beta_4 \text{INCRROA}_i + \beta_5 \text{LESSLEV}_i + \beta_6 \text{INCRSIZE}_i \\ & + \beta_7 \text{LOWROAX}_i + \beta_8 \text{HIGHLEVX}_i + \beta_9 \text{SMALLX}_i + \beta_{10} \text{INCRROAX}_i + \beta_{11} \text{LESSLEVX}_i + \beta_{12} \text{INCRSIZEX}_i \\ & + \beta_{13} \text{MARGINAL\_I} + \sum_j X_{ji} + \sum_k W_{ki} + u_i \end{aligned} \quad (3)$$

Our priors are that the interaction terms particularly β_{10} to β_{12} will capture any differences between BBB- and the other two ratings categories and that the coefficient on MARGINAL_I is not likely to be significant.

While Table 4 examines marginal investment grade firms relative to other firms in the same broad ratings category BBB, Table 5 looks at marginal speculative firms (i.e., BB+) and examines their likelihood of being upgraded one-tier compared to other tiers in the broad ratings category BB (i.e., BB and BB-). The dependent variable UP11 tells us whether a firm experienced a 1-tier upgrade (UP11 coded 1) or had no changes (UP11 coded 0) between time periods t and t+1. The dummy variables denote membership in the appropriate extreme quintile for each key determinant of credit ratings ï profitability, size and leverage ï now labeled HIGHROA, LARGE and LOWLEV, with changes in those variables defined as before. The model we estimate in Specification 1 is

$$\begin{aligned} \text{UP11}_i = {} & \alpha + \beta_1 \text{HIGHROA}_i + \beta_2 \text{LOWLEV}_i + \beta_3 \text{LARGE}_i \\ & + \beta_4 \text{INCRROA}_i + \beta_5 \text{LESSLEV}_i + \beta_6 \text{INCRSIZE}_i \\ & + \sum_j X_{ji} + \sum_k W_{ki} + u_i \end{aligned} \quad (4)$$

The anticipated signs on the coefficients of these variables are all positive, i.e., factors representing lower risk are positively associated with increased likelihoods of an upgrade.

The next two specifications use a dummy variable MARGINAL_S to compare speculative grade firms at the margin (BB+ firms, MARGINAL_S coded 1)) to other ratings in the broad ratings category BB (BB and BB- firms, MARGINAL_S coded 0). In the second specification of Table 5, we incorporate six interaction variables between MARGINAL_S and each of the six main variables in the previous model. The model we estimate is given by

$$\begin{aligned} \text{UP11}_i = {} & \alpha + \beta_1 \text{HIGHROA}_i + \beta_2 \text{LOWLEV}_i + \beta_3 \text{LARGE}_i + \beta_4 \text{INCRROA}_i + \beta_5 \text{LESSLEV}_i + \beta_6 \text{INCRSIZE}_i \\ & + \beta_7 \text{HIGHROAX}_i + \beta_8 \text{LOWLEVX}_i + \beta_9 \text{LARGEX}_i + \beta_{10} \text{INCRROAX}_i + \beta_{11} \text{LESSLEVX}_i + \beta_{12} \text{INCRSIZEX}_i \\ & + \sum_j X_{ji} + \sum_k W_{ki} + u_i \end{aligned} \quad (5)$$

For the reasons expressed earlier, we anticipate that the coefficients on HIGHROAX, LOWLEVX, and LARGEX are all insignificant. However, we expect firms at the margin to have better ratings outcomes due to positive changes to risk factors, i.e., in this case increased likelihoods of one-tier upgrades, given their increased incentives with respect to one-tier upgrades. This implies that the coefficients on INCRROAX, LESSLEVX, and INCRSIZEX are all positive.

In the third specified model in Table 5, we examine MARGINAL_S itself given the other variables in the model. The resulting model is given by:

$$\begin{aligned} \text{UP11}_i = {} & \alpha + \beta_1 \text{HIGHROA}_i + \beta_2 \text{LOWLEV}_i + \beta_3 \text{LARGE}_i + \beta_4 \text{INCRROA}_i + \beta_5 \text{LESSLEV}_i + \beta_6 \text{INCRSIZE}_i \\ & + \beta_7 \text{HIGHROAX}_i + \beta_8 \text{LOWLEVX}_i + \beta_9 \text{LARGEX}_i + \beta_{10} \text{INCRROAX}_i + \beta_{11} \text{LESSLEVX}_i + \beta_{12} \text{INCRSIZEX}_i \\ & + \beta_{13} \text{MARGINAL\_S} + \sum_j X_{ji} + \sum_k W_{ki} + u_i \end{aligned} \quad (6)$$

Our priors are that the interaction terms, particularly β_{10} to β_{12}, will capture any differences

between BB+ and the other two ratings categories (BB and BB-) and that the coefficient on MARGINAL_S is not likely to be significant.

3. Sample Selection Criteria

Our sample is drawn from Compustat North America Fundamental Annual.[2] Following previous literature, we deleted firms in the Utilities Industry (SIC codes greater than or equal to 4900 and less than 5000) and Financial Services (SIC codes greater than or equal to 6000 and less than 6500). This has been the practice on the grounds that utilities and financial services are heavily regulated, and so are different from other firms. Because some of the public concern with coddling has been motivated by scandals in financial services firms, we also later include these firms and replicate the analyses in our sensitivity tests. Observations with missing variables or ratings in our logistic regressions were also eliminated. Our final sample consists of firms that in time t are in the broad ratings categories BB and BBB (i.e., from the Compustat variable SPLTICRM) and that are also rated in time t+1. There are 12,525 firm year observations meeting these conditions.

Table 1 focuses on rating changes as of year t+1 by firms in the broad ratings categories BBB and BB, i.e., those rated from BB- to BBB+. The use of a 1-year horizon as our empirical definition of ñshort-termò matches previous work (e.g. Kisgen (2006)). Essentially, the short-run is a period in which for the firms in our sample ï all of which are large enough to be governed by SEC filing requirements, and with debt issues large enough to be rated ï significant production-investment changes are less likely though changes in risk factors influencing credit ratings are possible. The latter is important given the results in prior work that show that firms at the extreme of a rating tier, and especially at the margin of investment and speculative grade, do modify capital structure to try and maintain or improve ratings. With a longer horizon it is more

[2] Our initial sample consists of 158,949 firm-year observations for fiscal years from 1986 to the latest years available.

likely that many firm characteristics will change and the influence of well-known risk factors at time t will diminish. With a shorter horizon, there are far fewer ratings changes to begin with.

Table 1 indicates that ratings do not typically change in a year (i.e., 9,399 of 12,525 firms remained in the same grade) and most rating changes are one-tier changes. Column 1 representing 1-tier downgrades indicates that marginal investment grade (BBB-) firms are downgraded only 6.39% of the time, in contrast with the other categories that have a rate as high as 11.14%. In tests not shown, we examine these differences in the proportion of 1-tier downgrades both relative to the case of no changes and the broader subset consisting of other downgrades, no-changes, and upgrades. Our t-tests compare the marginal tier BBB- with three different benchmarks: the nearest investment grade tier BBB, the nearest 2 investment grade tiers BBB and BBB+, and all other tiers from BB- to BBB+. All these comparisons indicate that the one-tier downgrade rate for BBB- firms is significantly lower. Correspondingly, when we look at the column for 1-tier upgrades, we find the marginal speculative (BB+) firms are upgraded 11.2% of the time, which is higher than for other categories having a rate as low as 5.94%. Using analogous tests to the ones used for BBB- firms, we find that the one-tier upgrade rate for BB+ firms is significantly higher. Whether these differences are due to firms at the margin taking action to improve their risk factors, or whether they are due to coddling by the rating agency, is the open question that we focus on.

Table 2 examines Pearson and Spearman correlations of firm characteristics used later in logistic regressions in Tables 4 and 5 and with "RATING," an ordinal variable based on S&P Ratings, where combine the broad ratings categories of BB and BBB: BB- = 1, BB= 2, BB+ = 3, BBB- = 4, BBB = 5, and BBB+ = 6. The ratings are from Compustat variable SPLTICRM, where speculative (investment) grade firms have S&P Long Term Issuer ratings less than (equal

to or higher) BBB-. As in previous work, we also find that traditional determinants of operating performance (i.e., ROA), leverage (i.e., LEV) and size (SIZE) are significantly related to credit ratings in our sample. In particular, credit ratings rise in profitability and size, and decline in leverage. But profitability and size are negatively correlated, while leverage and size are positively correlated, underscoring the importance of a multivariate analysis where all these determinants are considered together.

Table 3 examines Pearson and Spearman correlations between changes in ratings and firm characteristics. In Panel A where we examine ratings changes to firms in the broad ratings category BBB, we find that DOWN11 (which is coded 1 if the firm is downgraded by one tier and 0 if firms have no ratings changes) is negatively associated (i.e., with p-values no higher than 0.001) with improvements in operating performance (i.e., INCRROA is coded 1 if a firmôs earnings go up), reductions in leverage (LESSLEV is coded 1 if firms reduce total debt relative to equity) and increases in size (INCRSIZE is coded 1 if total assets increase). We find analogous results in Panel B which examines ratings changes to firms in the broad ratings category BB, where UP11 (which is coded 1 if the firm is upgraded by one tier and 0 if firms have no ratings changes) is positively associated with improvements in operating performance, reductions in leverage and increases in size. We also find in Panel A and Panel B that there is a small positive association between reducing leverage and being at the margin of investment or speculative grade and reducing leverage. [3] In Panel A we find being marginal is also negatively associated with increasing firm size, in contrast to our expectations. Most noteworthy, however, is that we find little correlation in either Panel A or Panel B between being marginal and

[3] Later in the main multivariate analyses described in Tables 4 and 5 we find there is little added significance for marginal firms in changing leverage. Kisgen (2006) also indicates on page 1060 that his sensitivity tests indicate only small differences in the tendency by firms at the margin of investment and speculative grade to reduce leverage compared to firms in adjacent tiers.

improvements in profitability, which again differs from our expectations regarding firms under the óspotlight.ô This implies that firms may be able to find easier means of achieving better ratings outcomes via coddling by the rating agency.

4. Determinants of One-Tier Credit Ratings Changes for Firms at or near the Margin of Investment and Speculative Grades

A. Logistic Regressions

In this section we report the results of logistic regressions in Tables 4 and 5. Table 4 focuses on one-tier downgrades by firms in the broad ratings category BBB (including firms from BBB+ to BBB-), while Table 5 examines one-tier upgrades by firms in the broad ratings category BB (including firms from BB+ to BB-).

The dependent variable DOWN11 in Table 4 indicates whether a firm experienced a 1-tier downgrade (coded 1) or had no changes (coded 0). There are three specifications in each table as discussed in Section 2. In all three specifications, we find that having low earnings (LOWROA is coded 1) is positively associated with one-tier downgrades for firms in each ratings tier at 0.01 p-values. We also find in all three specifications that improvements in risk characteristics (i.e., operating performance measured by INCRROA, leverage measured by LESSLEV and size measured by INCRSIZE) are all incrementally important in avoiding downgrades at 0.01 p-values. What we do not find is also interesting. Being small or having high leverage at time t does not generally influence DOWN11 (HIGHLEV is marginally significant in the first specification but the significance goes away in the last two). As expected, we also find that interactions between being at the margin of investment grade (i.e., MARGIN_I is coded 1 for BBB- firms) and time t risk factors (i.e., LOWROAX, HIGHLEVX, and SMALLX) are all insignificant, consistent with the agencies being even handed with respect to

common, well-known and publicly observable risk factors at time t. These results suggest that the rating agency responds in a manner to preserve its long-term reputation. We also find that interactions between MARGIN_I and improvements in fundamental risk factors are also generally insignificant (INCRSIZEX is significant only in the second specification). To the extent that firms at the margin are more likely to make improvements (which we find only a little support for in Table 3), those changes do not seem to account for the favorable ratings outcomes for the BBB- firms relative to BBB and BBB+ firms found in Table 1. Rather, we find in specification 3 of Table 4 that the coefficient on MARGIN_I is significantly negative at the 0.01 level suggesting that the likelihood of a downgrade is less for firms at the margin than for the other firms (i.e., those in BBB and BBB+), ceteris paribus. This effect either reflects the impact of an unobservable risk factor improvement or coddling by the rating agency involving firms at the margin of investment grade.

The dependent variable UP11 in Table 5 indicates whether a firm experienced a 1-tier upgrade (coded 1) or had no changes (coded 0). In all three specifications in Table 5, we find that having high earnings (HIGHROA is coded 1) is positively associated with one-tier upgrades for firms in each tier within BBB at the 0.01 level. Thus operating performance measures at time t appear to influence ratings changes in both Tables 4 and 5. In contrast to Table 4, we find that size (LARGE) is significant in all three specifications at the 0.01 level, i.e., larger firms at time t are more likely to receive a one-tier upgrade by t+1. Similar to Table 4, we find in all three specifications that improvements in risk characteristics (i.e., operating performance, leverage, and size) are all incrementally relevant in achieving favorable ratings outcomes, as the coefficients on INCRROA, LESSLEV and INCRSIZE are all positive at the 0.01 level. Also similar to Table 4, we find that leverage at time t (i.e., measured by LOWLEV in Table 4 and

HIGHLEV in Table 5) does seem not to influence subsequent ratings decisions; and none of the coefficients on the interactions terms between MARGIN_S (which is coded 1 for BB+ firms) and time t risk factors (i.e., HIGHROAX, LOWLEVX, and LARGEX) or the interactions with improvement measures (i.e., INCRROAX, LESSLEVX, and INCRSIZEX) are significant. Rather, only MARGIN_S is significant. As in Table 4, this effect reflects either the impact of an unobservable risk factor improvement or coddling by the rating agency by the marginal firms.

Taken together, Tables 4 and 5 provide insight into how credit rating agencies make the tradeoff between coddling their clients to improve short-term market share, and their long-term concern for reputation. They do not treat the marginal firms differently from other firms with respect to well-known publicly available information about key determinants of credit ratings. While marginal firms may have a greater incentive to improve their ratings, their circumstances may afford them less opportunity to do so. The evidence is consistent with all firms, not just marginal firms, making a greater effort to improve these observable risk factors. This effort clearly accounts for some of the unexpectedly fewer downgrades in BBB- firms, and more upgrades in BB+, that we saw in Table 1. But observable risk factors and changes in them do not explain all of the deviations noted in Table 1. Specifications 3 in Tables 4 and 5 suggest that some of the effect can be ascribed either to unobservable risk factor improvements, or to coddling. Because we are examining changes within the short period of a year, the possibility of unobservable risk factor improvements seems less plausible; coddling seems the more likely explanation. The coddling effect appears stronger for marginal investment grade firms than for marginal speculative firms.

To understand how coddling can occur by ratings agencies, Shin (1994) provides a nice formal explanation for this type of result. While Shin motivates his model in terms of managerial

disclosure, the mathematical structure of the model applies more generally, and captures the essence of the credit rating agencyôs problem. The key element in the model is the assumption that the potential discloser of information uncovers private information, which can be interpreted as evidence. To make a public disclosure, the rating agency must reveal its supporting private evidence. However, to coddle a marginal investment grade firm requires hiding some negative evidence. So the rating agency will stop short of lying by saying nothing with respect to the negative information. This underscores the information asymmetry problems inherent in the ratings process, where regulators, investors, and other credit rating agencies cannot easily tell whether the agency is hiding negative evidence or whether it has no evidence at all. It also reveals potential myopic thinking on the part of the agencies that anticipate that the suppression of certain information will not come back to ôhaunt themô thus preserving their long-term reputation.

A compelling piece of anecdotal evidence about the plausibility of the hypothesis of coddling by the rating agency is provided in a recent news story (ñRaters Ignored Proof of Unsafe Loans, Panel Is Told,ò New York Times, September 27, 2010), emphasis below added by us:

> '.... The commission, a bipartisan Congressional panel, has been holding hearings on the origins of the financial crisis. D. Keith Johnson, a former president of Clayton Holdings, a company that analyzed mortgage pools for the Wall Street firms that sold them, told the commission on Thursday that almost half the mortgages Clayton sampled from the beginning of 2006 through June 2007 failed to meet crucial quality benchmarks that banks had promised to investors.
>
> Yet, Clayton found, Wall Street was placing many of the troubled loans into bundles known as mortgage securities.
>
> Mr. Johnson said he took this data to officials at Standard & Poor's, Fitch Ratings and to the executive team at Moody's Investors Service.
>
> "We went to the ratings agencies and said, 'Wouldn't this information be great for you to have as you assign tranche levels of risk?' " Mr. Johnson testified last week. ***But none of the agencies took him up on his offer, he said, indicating that it was against their business interests to be too critical of Wall Street.***
>
> "If any one of them would have adopted it," he testified, "they would have lost market share." ...'

The rating agencies have clearly felt the cost of ignoring negative evidence is small. On the other hand, to coddle a marginal speculative firm requires manufacturing positive evidence. This provides at least a starting point for security analysts and others to ask questions and ferret out more information, and challenge the evidence. So manufacturing false positive evidence is costly, in a way that hiding negative evidence is not. It is possible that suppressing negative evidence helps only a little bit to make client firms appear in a significantly better light. Hence the coddling effect is weaker for marginal speculative firms.

B. Sensitivity Tests

We considered several alternative measures for standard risk factors in our sensitivity tests and found that our results are robust. For example, we used various measures of operating performance other than net income in ROA and INCRROA that was used in Tables 4 and 5, including net income before extraordinary items, operating income before depreciation, cash flow from operations and EBITDA. We also used sales instead of total assets to measure SIZE. We used quartiles and the median instead of quintiles to rank risky firm characteristics within each ratings category at time t. We measured the change in leverage using changes in total liabilities rather than the change in total debt. In all cases, our conclusions remained the same.

We also used different control groups. For example, we used the following control groups in our tests of one-tier downgrades for BBB- in addition to the one in Table 4 (i.e., BBB and BBB+) : (a) BBB; (b) BBB, BBB+, BB+, BB, and BB-. We also used the following control groups in our tests of one-tier upgrades for BB+ in addition to the one in Table 5 (BB and BB-): (a) BB; (b) BB, BB-, BBB-, BBB, BBB+. In all cases, our conclusions remained the same regardless of whether the comparison group was defined more narrowly or more broadly. Also,

in our main analysis we followed prior work and eliminated both utilities and financial services firms, both being heavily regulated industries. But financial services firms have also been in thick of rating controversies in recent times. So we checked the sensitivity of our results in Tables 4 and 5 to the addition of financial services firms. The qualitative conclusions in Tables 4 and 5 continue to hold exactly as before. Finally, we originally compared one-tier changes to no changes as our dependent variables in Tables 4 and 5. We also compared one-tier changes to all other ratings outcomes and found that our results are robust.

5. Conclusions

Firms at the margin of investment grade and speculative grade are anticipated to have an incentive to work hard and improve the values of risk factors that could help them maintain or improve their credit ratings. Their managers are more likely to be under the spotlight from both shareholders and bondholders. The net benefits of improving risk factors to achieve favorable one-tier ratings changes appear particularly large to firms at the margin relative to other firms in nearby ratings categories. However, these marginal firms may also have an incentive to pressure rating agencies by offering incentives. The agencies face a tradeoff between coddling paying firms who seek a higher rating, and being conservative to ensure their own long-term reputation among investors. There has been little empirical evidence of systematic coddling behavior on the part of the agencies. Also, few papers have examined economic choices (particularly regarding operations and size) involving marginal firms and the relative effect of those decisions on near-term ratings changes.

We initially find in our univariate tests that marginal investment grade firms are downgraded one tier less often and marginal speculative grade firms are upgraded one tier more

often than other comparable firms. These differences persist even after controlling for firms at the margin improving profitability, reducing debt in their capital structure, and increasing size. We find evidence consistent with the control firms, not just marginal firms, making significant improvements to risk factors, such as profitability, leverage and size, to improve credit ratings. The fact that firms at the margin do not evidence any greater likelihood to improve operating performance than firms under less pressure is particularly surprising. In the absence of explaining the univariate results using conventional risk factors, our findings are consistent either with firms at the margin reducing unobservable risk factors and/or benefitting from coddling by the rating agency. Our findings highlight the need for practitioners to not only analyze ratings changes for BB+ firms but to also question decisions not to change ratings for BBB- firms.

The main limitation of our work is that we do not know what information is available to the rating agency beyond what is publicly available. Nor do we know the exact manner in which it processes information to arrive at its own posterior belief or considered private opinion about a firm. So it is harder to identify other factors relevant to ratings changes and distinguish coddling behavior by the rating agencies from these other unobservable factors. Focusing on the near-term in which a priori there is less scope for other things to change alleviates this problem a bit.

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Table 1

Frequencies of ratings changes in broad ratings categories BBB and BB

Credit Ratings Changes										
S&P Rating	Ratings declines					Ratings increases				Total
	>3	3	2	1	0	1	2	3	>3	
BB-	41	31	95	255	1892	253	50	7	4	2628
	1.56%	1.18%	3.61%	9.70%	71.99%	9.63%	1.90%	0.27%	0.15%	
BB	20	19	63	223	1432	177	53	13	2	2002
	1.00%	0.95%	3.15%	11.14%	71.53%	8.84%	2.65%	0.65%	0.10%	
BB+	16	18	61	127	1007	160	29	9	2	1429
	1.12%	1.26%	4.27%	8.89%	70.47%	11.20%	2.03%	0.63%	0.14%	
BBB-	28	29	75	130	1564	186	18	5	0	2035
	1.38%	1.43%	3.69%	6.39%	76.86%	9.14%	0.88%	0.25%	0.00%	
BBB	30	23	51	203	1974	165	27	3	1	2477
	1.21%	0.93%	2.06%	8.20%	79.69%	6.66%	1.09%	0.12%	0.04%	
BBB+	25	9	50	205	1530	116	14	5	0	1954
	1.28%	0.46%	2.56%	10.49%	78.30%	5.94%	0.72%	0.26%	0.04%	
Total	160	129	395	1143	9399	1057	191	42	9	12525

This table presents the frequency of changes in S&P Long Term Credit Rating Issuer Ratings (Compustat variable SPLTICRM) as of t+1 compared to time t over the period 1987 to 2009. The table specifically examines ratings ranging from BBB+ to BB-, which are at or near the margin between investment and speculative ratings,i.e., speculative (investment) grade firms are those whose S&P Long Term Issuer ratings are less than (equal to or higher than) BBB-. In addition to deleting observations with missing ratings in year t through t+1, we also delete observations with missing variables in the logistic regressions of Tables 4 and 5.

Table 2
Correlations between firm characteristics and ratings

	RATING	RATING_t+1	ROA	LEV	SIZE
RATING		0.871	0.201	-0.216	0.395
		(0.001)	(0.001)	(0.001)	(0.001)
RATING_t+1	0.918		0.281	-0.225	0.337
	(0.001)		(0.001)	(0.001)	(0.001)
ROA	0.224	0.295		-0.228	-0.019
	(0.001)	(0.001)		(0.001)	(0.033)
LEV	-0.203	-0.219	-0.324		0.032
	(0.001)	(0.001)	(0.001)		(0.001)
SIZE	0.394	0.361	-0.040	0.081	
	(0.001)	(0.695)	(0.001)	(0.001)	

This table examines Pearson (above diagonal) and Spearman (below diagonal) correlations of firm characteristics from logistic regressions in Tables 4 and 5 along with ñRATING,ò an ordinal variable based on S&P Ratings: BB- = 1, BB = 2, BB+ = 3, BBB- = 4, BBB = 5, BBB+ = 6. The ratings are from Compustat variable SPLTICRM, where speculative (investment) grade firms have S&P Long Term Issuer ratings less than (equal to or higher) BBB-. Observations with missing variables or missing ratings in year t through year t+1 were eliminated. Also, continuous variables with values above the 99th (below the 1st) percentile are winsorized at those values. The variable definitions (Compustat variables in parenthesis) are ROA=net income (NI) divided by total assets (AT); SIZE=log(total assets) (AT); LEV= total liabilities (AT-SEQ) divided by book value of stockholderôs equity (SEQ). Firm-year observations included in the analysis are 12,525. We delete observations with missing variables in either t and t+1. The p-values are in parenthesis below the correlation coefficients with values equal to or below 0.001 truncated at 0.001.

Table 3

Correlations between changes in firm characteristics and one-tier downgrades or upgrades

Panel A (n=5,606): Investment grade firms in the broad ratings category BBB that experienced no change or a one-tier downgrade by t+1.

	DOWN11	INCRROA	LESSLEV	INCRSIZE	MARGINAL_I
DOWN11		-0.115	-0.096	-0.143	-0.043
		(0.001)	(0.001)	(0.001)	(0.001)
INCRROA	-0.115		0.248	0.196	-0.005
	(0.001)		(0.001)	(0.001)	(0.695)
LESSLEV	-0.096	0.248		-0.015	0.027
	(0.001)	(0.001)		(0.262)	(0.041)
INCRSIZE	-0.143	0.196	-0.015		-0.032
	(0.001)	(0.001)	(0.262)		(0.016)
MARGINAL_I	-0.043	-0.005	0.027	-0.032	
	(0.001)	(0.695)	(0.041)	(0.016)	

Panel B (n=4,921): Speculative grade firms in the broad ratings category BB that experienced no change or a one-tier upgrade by t+1.

	UP11	INCRROA	LESSLEV	INCRSIZE	MARGINAL_S
UP11		0.089	0.085	0.108	0.030
		(0.001)	(0.001)	(0.001)	(0.038)
INCRROA	0.089		0.286	0.174	0.014
	(0.001)		(0.001)	(0.001)	(0.316)
LESSLEV	0.085	0.286		-0.034	0.033
	(0.001)	(0.001)		(0.016)	(0.019)
INCRSIZE	0.108	0.174	-0.034		0.008
	(0.001)	(0.001)	(0.016)		(0.562)
MARGINAL_S	0.030	0.014	0.033	0.008	
	(0.038)	(0.316)	(0.019)	(0.562)	

This table examines Pearson (above the diagonal) and Spearman (below the diagonal) correlations between ratings changes and changes in risk factors from period t to period t+1 that are examined in the logistic regressions in Tables 4 and 5. Note that the Spearman and Pearson coefficients are equal when the variables are dichotomous. DOWN11 (UP11) is coded 1 if a firm experiences a one-tier downgrade (upgrade) in period t+1 and is otherwise coded 0 if firms experience no change; INCRROA is coded 1 if a firm experiences an increase in net income in period t+1 and is otherwise coded 0; LESSLEV is coded 1 if a firm experiences a decline in total debt relative to equity in period t+1 and is otherwise coded 0; INCRSIZE is coded 1if a firm experiences an increase in total assets in period t+1 and is otherwise coded 0; MARGINAL_I (MARGINAL_S) is coded 1 for firms in BBB- (BB+) and is otherwise coded 0 for firms in the same broad ratings category. The p-values are in parenthesis below the coefficients with values equal to or below 0.001 truncated at 0.001.

Table 4
Determinants of one-tier downgrades in broad ratings category BBB

	Specification 1			Specification 2			Specification 3		
Parameter	Estimate	Std Error		Estimate	Std Error		Estimate	Std Error	
INTERCEPT	-2.087	0.234	***	-2.083	0.234	***	-1.894	0.240	***
LOWROA	1.025	0.119	***	1.025	0.136	***	0.962	0.137	***
HIGHLEV	0.219	0.121	*	0.183	0.140		0.130	0.141	
SMALL	-0.180	0.145		-0.110	0.163		-0.167	0.164	
INCRROA	-0.707	0.110	***	-0.740	0.128	***	-0.765	0.127	***
LESSLEV	-0.593	0.101	***	-0.532	0.116	***	-0.615	0.118	***
INCRSIZE	-0.694	0.102	***	-0.591	0.113	***	-0.714	0.118	***
LOWROAX				-0.011	0.244		0.241	0.257	
HIGHLEVX				0.143	0.258		0.319	0.264	
SMALLX				-0.276	0.328		-0.025	0.337	
INCRROAX				0.107	0.242		0.206	0.250	
LESSLEVX				-0.172	0.204		0.138	0.231	
INCRSIZEX				-0.419	0.202	**	-0.069	0.233	
MARGINAL_I							-0.707	0.224	***
Likelihood Ratio		415***			425***			436***	
Observations		1=538, 0 = 5068			1=538, 0 = 5068			1=538, 0 = 5068	
Pseudo-R2		0.1521			0.1559			0.1595	

This table presents logistic regression for firms in rating categories BBB+ to BBB- from 1987 to 2009. The dependent variable is coded 1 if firms are downgraded one-tier as of t+1 and otherwise coded 0 if firms experience no ratings change. The credit ratings are based on the Compustat variable SPLTICRM, where speculative (investment) grade firms have S&P Long Term Issuer ratings less than (equal to or higher) "BBB-. Observations with missing variables or missing ratings in period t or t+1 are eliminated. The variable definitions: MARGINAL_I is coded 1 if firms are rated BBB- and is otherwise coded 0 if firms are rated BBB or BBB+; LOWROA are firms in the lowest quintile of ROA in their ratings category at time t where ROA is net income (NI) divided by total assets(AT) at t; HIGHLEV are firms in the highest quintile of leverage at time t among firms with the same credit rating and is otherwise coded 0, where leverage equals total liabilities (AT-SEQ) divided by total assets (AT); SMALL is coded 1 if firms are in the lowest quintile of size at time t among firms with the same credit rating and is otherwise coded 0, where SIZE is the log (total assets) (AT); LESSLEV is coded 1 if firms experienced a decline in the total of short- and long-term debt (DLC+DLTT) relative to stockholdersô equity between t and t+1; INCRROA are firms with increased net income from t to t+1; INCRSIZE are firms with increased size from t to t+1, where SIZE is log (total assets); Variables ending with X are interacted with MARGINAL_I. *Results for both year and Fama and French (1997) industry dummies are omitted.* The Wald Chi-Square is listed in parenthesis. ***,** and * denote significance at the 1, 5 and 10 % levels, respectively.

Table 5
Determinants of one-tier upgrades to broad ratings category BB

	Specification 1			Specification 2			Specification 3		
Parameter	Estimate	Std Error		Estimate	Std Error		Estimate	Std Error	
INTERCEPT	-3.323	0.319	***	-3.330	0.320	***	-3.500	0.333	***
HIGHROA	0.838	0.108	***	0.856	0.123	***	0.879	0.124	***
LOWLEV	0.150	0.118		0.178	0.134		0.193	0.135	
LARGE	0.563	0.120	***	0.482	0.136	***	0.521	0.138	***
INCRROA	0.500	0.108	***	0.505	0.123	***	0.544	0.126	***
LESSLEV	0.482	0.104	***	0.451	0.117	***	0.497	0.121	***
INCRSIZE	0.706	0.121	***	0.711	0.134	***	0.797	0.145	***
HIGHROAX				-0.063	0.235		-0.144	0.236	
LOWLEVX				-0.116	0.262		-0.164	0.260	
LARGEX				0.323	0.236		0.158	0.248	
INCRROAX				-0.022	0.229		-0.167	0.235	
LESSLEVX				0.113	0.216		-0.078	0.232	
INCRSIZEX				0.011	0.215		-0.304	0.262	
MARGINAL_S							0.629	0.316	**
Likelihood Ratio	305***			309***			312***		
Observations	1=590, 0 = 4331			1=590, 0 = 4331			1=590, 0 = 4331		
Pseudo R^2	0.1157			0.117			0.1184		

This table presents logistic regression for firms in rating categories BB+ to BB- from 1987 to 2009. The dependent variable is coded 1 if firms are upgraded one-tier as of t+1 and otherwise coded 0 if firms experience no ratings change. The credit ratings are based on the Compustat variable SPLTICRM, where speculative (investment) grade firms have S&P Long Term Issuer ratings less than (equal to or higher) "BBB-. Observations with missing variables or missing ratings in period t or t+1 are eliminated. The variable definitions: MARGINAL_I is coded 1 if firms are rated BB+ and is otherwise coded 0 if firms are rated BB or BB-; HIGHROA are firms in the highest quintile of ROA in their ratings category at time t where ROA is net income (NI) divided by total assets(AT) at t; LOWLEV are firms in the lowest quintile of leverage at time t among firms with the same credit rating and is otherwise coded 0, where leverage equals total liabilities (AT-SEQ) divided by total assets (AT); LARGE is coded 1 if firms are in the highest quintile of size at time t among firms with the same credit rating and is otherwise coded 0, where SIZE is the log (total assets) (AT); LESSLEV is coded 1 if firms experienced a decline in the total of short- and long-term debt (DLC+DLTT) relative to stockholdersô equity between t and t+1; INCRROA are firms with increased net income from t to t+1; INCRSIZE are firms with increased size from t to t+1, where SIZE is log (total assets); Variables ending with X are interacted with MARGINAL_S. *Results for both year and Fama and French (1997) industry dummies are omitted.* The Wald Chi-Square is listed in parenthesis. ***,** and * denote significance at the 1, 5 and 10 % levels, respectively.