**Earnings Smoothing Activities of Firms to Manage Credit Ratings\***

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**Abstract**

This paper explores the effect of incentives to maintain or improve credit ratings on corporate financial reporting. Credit ratings have significant cost implications for companies because they are directly related to companies’ borrowing cost, and ratings changes are reflected in both stock returns and bond yields. Managers therefore have incentives to maintain or improve their companies’ credit ratings. Both managers and rating agencies view earnings smoothness as an important input into the rating process. We argue that firms have incentives to manage credit ratings through smoothing earnings and as a result, the degree of earnings smoothing activity is larger for those with greater incentives. We hypothesize that firms within broad rating categories (e.g., AA) have differential incentives to smooth earnings, depending on whether their rating is at the top or bottom notch of the rating category (e.g., AA+ or AA-, respectively) versus in the middle of the rating category (e.g., AA). This increased incentive stems from a higher probability of being upgraded (downgraded) into a higher (lower) broad rating category for firms in the outer notches. Our empirical evidence is consistent with increased earnings smoothing for these firms. We further hypothesize and find that those firms in the outer notches who rely more heavily on debt financing smooth earnings to a larger extent than firms who do not rely as much on debt financing. Finally, we examine whether smoothing behavior has an impact on subsequent credit ratings. We find that increased earnings smoothness reduces (raises) the likelihood of a rating downgrade (upgrade) in the following period.

JEL Classification: M41

**Keywords:** Earnings smoothing; Credit ratings

**Data Availability:** All data used in this study are publicly available from the sources identified in the text.

**Earnings Smoothing Activities of Firms to Manage Credit Ratings**

1. **Introduction**

Graham et al. (2005) provide evidence that managers greatly value smooth earnings. In their survey of 401 executives, 97 percent of managers indicate that they prefer a smooth earnings path *even when cash flow volatility is constant*. Despite the emphasis of managers on earnings smoothing and the vast literature on why managers prefer smooth earnings,[[1]](#footnote-2) to our knowledge, the literature has not provided a link between the importance that managers place on smooth earnings and corporate reporting behavior. We investigate whether the strength of incentives to manage perceived debt-paying ability, and thus credit ratings (Trueman and Titman 1988), is related to mangers’ discretionary earnings smoothing activity. We also investigate the effectiveness of this strategy on rating agencies’ assessment of credit ratings.

We focus on the incentive to improve or maintain credit ratings because ratings play a key role in corporate financing and investment decisions (Blume et al. 1998) and rating changes have significant cost implications for companies (e.g., Holthausen and Leftwich 1986; Ederington and Goh 1998; Dichev and Piotroski 2001). More importantly, despite the commonly-recognized importance of credit ratings to firms, the effect of the incentive to maintain or improve credit ratings on managers’ discretionary behavior is largely unknown.

A necessary condition for incentives to manage credit ratings affecting earnings smoothing behavior is that earnings smoothness must be viewed as a key rating factor by both managers and rating agencies. Graham et al. (2005) confirm managers’ perceived importance of smooth earnings. Approximately 42 percent of the managers in their survey believe that smoother earnings enable them to preserve current credit ratings or achieve better credit ratings. Rating agencies’ description of their rating process and rating decisions reveal that they consider earnings smoothness to be a key rating factor. For example, Moody’s lists earnings volatility as one of the key rating factors in its rating methodology (Moody’s Rating Methodology, June 2006). In explaining its rating decisions for Freddie Mac (RatingsDirect report, December 29, 2006) and Sony (Business Week, November 22, 2004), S&P cited earnings volatility as a key rating issue.Empirically, Gu and Zhao (2006) document a significant relation between credit ratings and earnings volatility, with earnings volatility dominating cash flow volatility in explaining credit ratings.

Both the perceived importance of earnings smoothness by managers and the reliance of rating agencies on earnings smoothness in their rating decisions increase managers’ incentives to smooth earnings. However, there are several factors that may impact the strength of these incentives. First, earnings smoothing is costly because it consumes mangers’ time and effort. Second, firms can lose credibility among stakeholders when their discretionary behavior is detected (Goel and Thakor 2003). Thus, it is not always optimal to smooth earnings (Gonedes 1972). In addition, credit rating agencies have substantial expertise and have access to a broad set of information, including private information, so they are in a good position to detect bond issuers’ earnings smoothing activities. Rating agencies’ ability to detect discretionary earnings smoothing could discourage managers from undertaking such activity (Jorion et al. 2005).[[2]](#footnote-3)

Finally, even if rating agencies are capable of completely detecting earnings smoothing, they may lack incentive to do so. On one hand, rating agencies must retain their reputations to continue attracting revenues (Smith and Walter 2001). This provides incentives for the rating agencies to detect and adjust for bond issuers’ opportunistic activities. In an article discussing rating agencies and the current sub-prime mortgage crisis, Brian Clarkson, former president and chief operating officer for Moody’s, commented on the general role of rating agencies:

“We join others who have emphasized the crucial role trust and transparency play in the capital markets and recognize the function rating agencies play in supporting those goals…We are committed to doing the best job possible for investors by providing informed and unbiased opinions about the credit risk of securities we rate” (Financial Times, 18 September 2007, p. 42).

On the other hand, rating agencies’ incentives to discourage opportunistic behavior may be compromised by conflicts of interest resulting from their dependence on rating fees paid by issuers and pressure from issuers, investment banks, and commercial banks (Covitz and Harrison 2003; *Economist* 2005).[[3]](#footnote-4) In summary, given the cost of smoothing earnings for management, rating agencies’ ability (or lack thereof) to detect earnings smoothing, and their opposing incentives to detect earnings smoothing behaviors due to reputational concerns versus dependence on rating fees, whether managers smooth earnings to manage credit ratings becomes an empirical question.

Drawing on the literature (Kisgen 2006; Shah 2007), we examine a setting where we can identify managers with stronger incentives to preserve current credit ratings or achieve higher credit ratings. These are firms whose credit ratings are in the upper or lower end of each broad rating category (i.e., having either a “+” or a “-”appended to their broad rating category). We refer to these firms as being near a rating change to another broad category.[[4]](#footnote-5) Given that most rating changes are by one “notch,” firms with a + or – notch rating are more likely to shift among broad categories than are firms in the middle notch (i.e., be upgraded to the next higher broad category in the case of a + notch, or be downgraded to the next lower broad category in the case of a – notch). The stronger incentives arise from regulators’ general focus on broad ratings rather than “notch” ratings (Kisgen 2006), a greater yield difference between two adjacent ratings that cross broad rating categories than between two ratings within the same broad category (Shah 2007), and a stronger market response to one-notch rating revisions that are across two adjacent broad ratings than to revisions within the same broad rating category (see the Appendix). Thus, to test whether managers smooth earnings to manage credit ratings, we examine whether managers of firms with a + or – notch rating are more likely to smooth earnings than managers of other firms.

We find that firms close to a rating change smooth earnings to a larger extent than do other firms within the same broad rating category. In addition, among firms near a rating change, those with higher financing needs smooth earnings to a larger extent than others. Finally, we find a negative (positive) relation between an increase in earnings smoothness and the likelihood of a subsequent rating downgrade (upgrade). A wide range of sensitivity analyses do not change our main inferences. For example, the results are robust to three different measures of earnings smoothing activities and use of absolute value of discretionary accruals as a proxy for discretionary earnings management. The results also generally hold among both firms that meet earnings thresholds (such as analyst forecast, prior year earnings, or zero earnings) and those that miss earnings thresholds, suggesting that the short term incentives to meet earnings thresholds do not entirely drive or subsume the smoothing activity related to debt rating changes.

Our analysis focuses on longer term earnings smoothing rather than on shorter term accruals management (e.g., signed discretionary accruals) for two reasons. First, credit ratings are meant to discriminate relative long-term risk (Moody’s 2002). To evaluate the credit-worthiness of issuers, credit rating agencies consider both the short-term earnings improvement and its persistence. Use of discretionary accruals management to improve earnings increases short-term earnings, but these increases are unlikely to persist due to later accrual reversals. Such reversals increase the volatility of earnings and reduce the predictability of future earnings. Second, we examine issuers’ general earnings management tendency that does not depend on specific events, such as when firms are issuing new debt or face a rating change. Thus, even if some sample firms have the tendency to manage earnings upward upon those events, the incentive to smooth earnings would dominate in our general setting.[[5]](#footnote-6)

This study contributes to the literature in several ways. First, prior studies primarily document opportunistic reporting behaviors associated with equity market incentives. However, firms that participate in the public debt market also have incentives to improve perceptions of their financial health and, thus, may also engage in opportunistic behaviors such as earnings management. By focusing on incentives related to managing perceptions of a single group of well-informed users (i.e., bond rating agencies), we avoid confounding effects in more traditional equity market settings from other incentives and investors’ differential abilities and investment goals (e.g., speculation versus long-term investment). Second, prior literature either examines incentives to smooth earnings or the consequence of this behavior. We extend the literature by investigating variation of managers’ earnings smoothing behavior associated with the strength of a specific incentive. Finally, prior literature on debt-related earnings management focuses on firms that move close to default on their debt covenants (Watts and Zimmerman 1986). We employ a sample of firms within a broad spectrum of financial health, ranging from investment-grade to speculative-grade debt and a setting where management’s differential incentives to manage earnings can be identified. We are thus able to provide broader inferences about debt-related earnings management.

The remainder of the paper is organized as follows. The next section develops hypotheses relating credit ratings to earnings smoothing incentives. Section 3 outlines the research designs. Section 4 describes the sample, presents descriptive statistics, and reports the results of our main tests. Section 5 includes sensitivity analyses, and section 6 concludes.

**2. Literature review and hypothesis development**

**2.1. Background on credit ratings and related incentives**

Credit rating agencies such as Standard & Poor’s and Moody’s evaluate credit risk and assign credit ratings to issues, issuers, or both. Credit risk is defined as the possibility that a bond issuer will default by failing to make principal and interest payments under the bond’s terms.[[6]](#footnote-7) A credit rating is basically an opinion provided by a rating agency as to credit risk. The primary credit rating category is most commonly denoted with letter ratings. For example, S&P uses ten “broad” categories (i.e., AAA, AA, A, BBB, BB, B, CCC, CC, C, D). S&P divides each broad category from AA to CCC into three subcategories, or “notches” (+/none/-).[[7]](#footnote-8) If a rating agency announces a downgrade (upgrade), it means that the debt rating agency believes that the issuer’s or the issue’s credit quality has decreased (increased) and the probability of default has increased (decreased).

Ratings have significant cost implications for companies. Not only do ratings impact the cost of future borrowing, but numerous studies (e.g., Holthausen and Leftwich 1986; Ederington and Goh 1998; Dichev and Piotroski 2001) show that rating changes significantly affect both stock and bond valuations. For example, Dichev and Piotroski (2001) document a three-day market response to credit rating downgrades of -1.97 percent, suggesting that the economic costs associated with rating downgrades are substantial.

The significant stock and bond market response to rating changes creates incentives for bond issuers to improve or maintain their credit ratings. Recent studies suggest that incentives vary among bond issuers, and those with “+” or “-” notch ratings have stronger incentives than other firms in the same broad rating category (Kisgen 2006; Shah 2007). The incentive variation arises from variations in regulatory costs, bond yield, and stock market response to rating changes that are of the same magnitude, but which result in movement across versus within broad rating categories.

Kisgen (2006) argues that regulators generally do not focus on notch ratings, so firms are more concerned about changes in their broad rating category.[[8]](#footnote-9) For example, A and A- are generally considered as similar from a regulatory perspective. If a firm with A- is downgraded by one level to BBB+, it will be pooled with all firms within the broad BBB rating, including BBB+, BBB, and BBB-, rather than being viewed as just one notch below A-. The firm will thus incur higher regulatory costs than if it were an A firm moving down to A-. Kisgen finds that firms near rating changes to an adjacent broad rating category are less likely to issue debt than equity because a significant debt offering might trigger a downgrade or prohibit an upgrade. Shah (2007) documents a greater change in yield between two adjacent ratings across broad rating categories than between two ratings within the same broad category.[[9]](#footnote-10) Shah (2007) reports that compared to other firms, firms near a rating downgrade tend to spend less on investments. Thus, according to Kisgen (2006) and Shah (2007), credit ratings are important to firms, and managers’ actions appear to be consistent with their incentives to maintain or improve current ratings.

In the appendix, we provide further evidence of firms near a rating change having more powerful incentives to influence credit ratings. We document a stronger market response to one-notch rating revisions across two adjacent broad ratings than to revisions within the same broad rating category. Untabulated analysis also shows that 64 percent of credit rating revisions between April 1995 and December 2006 are by one notch (73 percent for investment grade and 55 percent for speculative grade). Thus, compared to firms in the middle notch, firms with a plus or minus notch rating are more likely to experience ratings changes that move them to an adjacent broad rating category and have greater incentives to increase (decrease) the likelihood of being upgraded (downgraded).

**2.2. Literature on credit ratings and earnings smoothness**

Financial performance is an important determinant of credit ratings. Although other factors, such as industry risk, capital structure, and management efficiency, affect credit ratings, these factors appear to be less salient than financial performance. For example, Goh and Ederington (1993) find that firm value is more significantly affected by credit rating changes triggered by financial performance than by other factors. They provide evidence that the stock market reacts negatively to only those downgrades claimed by rating agencies as being associated with deterioration in a firm’s financial measures.

We focus on managing earnings smoothness as a means to manage credit ratings not only because earnings smoothness is an important input into the rating methodology, but also because Graham et al. (2005) find that managers’ preference for a smooth earnings path is very strong. For example, managers claim that they prefer smoother earnings even if it means sacrificing long-term firm value, since a more volatile earnings path can result in an increase in the cost of debt and equity (Graham et al. 2005).[[10]](#footnote-11)

Managers can reduce the probability of default risk as perceived by both investors and rating agencies by smoothing earnings. In an analytical study, Trueman and Titman (1988) show that reducing volatility of the underlying earnings process can affect the perceived probability of bankruptcy risk. Beaver et al. (1970) show that earnings smoothness impacts perceived firm risk. Francis et al. (2005) show that debt markets price information risk associated with earnings volatility. The market also appears to associate earnings volatility with debt-related costs. Collins et al. (1981) and Lys (1984) find negative returns at announcements of accounting rule changes that are predicted to increase earnings volatility, with more negative returns for firms with stricter debt constraints.

**2.3. Hypothesis development**

As discussed earlier, rating changes have significant cost and benefit implications for bond issuers in both the debt and equity markets. This provides incentives for bond issuers to increase (decrease) the likelihood of upgrades (downgrades). Since credit rating agencies include earnings volatility in their rating process and managers believe that smoother earnings help achieve and preserve better credit ratings, it is likely that managers have incentives to smooth earnings in an attempt to influence their debt ratings. However, there are several factors that affect managers’ incentives for earnings smoothing activity.

Credit rating agencies likely have the ability to completely undo earnings management. As argued by Jorion et al. (2005), credit rating agencies are sophisticated users of financial information, who have access to a broad set of information, including private information. Their access, expertise and ability weaken managers’ incentive to manage earnings. However, raters may lack incentives to uncover bond issuers’ earnings smoothing activities because the majority of rating agency revenue stems from rating fees paid by bond issuers. Since 1968, due to increasing cost of maintaining the quality of credit ratings and growing demand for more rating coverage, rating agency revenue structure has shifted from investor-based compensation (e.g., subscription fees collected from investors) to issuer-based payments (e.g., rating fees). According to Moody’s 10K in 2005, it obtains 87% of its revenue from issuers. In addition, rating agencies are developing consulting businesses which advise on matters that might affect an issuer’s rating (*Economist* 2005). This may create conflicts of interest that influence agencies’ objectivity. Recent business articles also claim that the conflict of interest which exists in the relationship between rating agencies and bond issuers is similar to that between auditors and clients, or to the conflict of interest between stock analysts and the firms they follow.

Rating agencies are unlikely to risk their reputation for any one issuer, however.[[11]](#footnote-12) As pointed out by Smith and Walter (2001) (and understood by the rating agencies), bond issuers’ demand for rating services depends on the rating agencies’ reputation as perceived by the investors.[[12]](#footnote-13) If investors view certain rating agencies as less competent and their ratings as inaccurate, they will disregard the ratings, rendering the rating service valueless to bond issuers. Thus, rating agencies have incentives to adjust for bond issuers’ opportunistic behaviors. This mitigates managers’ incentives to smooth earnings, at least to the extent that rating agencies can see through earnings smoothing activities.

Given bond issuers’ incentives to increase earnings smoothness and credit rating agencies’ ability and incentives (or disincentives) to adjust discretionary smoothing activity, whether bond issuers discretionarily smooth earnings remains an empirical question. Since the implications of rating changes are greater for firms whose credit ratings are near a change to the adjacent broad rating category, these firms would have greater incentives than others to increase earnings smoothness. We hypothesize (in the alternative form) that:

H1: Firms whose credit ratings are near a rating upgrade or a downgrade to an adjacent broad rating category smooth earnings smoothness to a greater extent than other firms within the same broad rating category.

Among firms whose credit ratings are near a change to the adjacent broad rating category, credit rating changes would result in greater benefits or costs (e.g., bond yield changes) for firms that will rely more on debt financing in the future. These firms thus have a stronger incentive to improve or maintain credit ratings and are more likely to smooth earnings. On the other hand, firms that do not plan to issue a large amount of debt have weaker incentives to maintain or improve credit ratings. This leads to the following hypothesis (in the alternative form):

H2: Among firms whose credit ratings are near a rating upgrade or a downgrade to an adjacent broad rating category, those with higher debt financing needs smooth earnings to a larger extent.

If managers engage in earnings smoothing activity and credit rating agencies are able to detect such behavior, agencies may adjust for the increased earnings smoothness. In this case, smoothing behavior would not have a favorable influence on credit ratings. For example, S&P’s methodology for non-US companies takes into account the fact that discretionary earnings smoothing activities are more prevalent in countries outside of the U.S. “In other regions – aided by local tax regulation - it is normal practice to take provisions against earnings in good times to provide a cushion against downturns, resulting in a long run “smoothing” of reported profit[s].”[[13]](#footnote-14) However, to the extent that ratings agencies have conflicts of interest or cannot fully detect earnings smoothing activities, ratings agencies may not completely adjust their ratings for discretionary accrual-based increases in earnings smoothness. Thus, we investigate whether managing earnings smoothness indeed impacts credit ratings.[[14]](#footnote-15)

H3: Debt rating upgrades (downgrades) are more (less) likely for firms with increases in earnings smoothness.

**3. Research design**

**3.1 Research design for tests of H1**

To test Hypothesis H1, we first examine the extent of earnings smoothing activity by firms with a plus or minus notch rating relative to firms in the middle notch within the same broad rating category. We consider earnings smoothness associated with discretionary accruals as a proxy for earnings smoothing activity. We measure earnings smoothness as the standard deviation of earnings scaled by the standard deviation of cash flows from operating activities (Hunt, Moyer, and Shevlin 1997; Leuz, Nanda, Wysocki 2003; Pincus and Rajgopal 2002; Bowen, Rajgopal, and Venkatachalam 2008). Then this result is multiplied by -1 so that a higher value is associated with smoother earnings. As explained by Leuz et al. (2003), scaling by cash flow from operations controls for differences in the variability of economic performance across firms. Such scaling also is intended to isolate any possible cash flow smoothing activity. Earnings smoothing activity (SMOOTHACT) is measured by subtracting smoothness based on earnings adjusted for discretionary accruals (SMOOTHXEM) from smoothness based on reported earnings (SMOOTH). Discretionary accruals are estimated from the modified Jones (1991) model. This measure of SMOOTHACT thus separates smoothness controlled by the manager from inherent smoothness in earnings determined by economic and firm-specific factors. This first measure is denoted as SMOOTHACT1, where the superscript refers to the first measure of earnings smoothing activity.

Earnings smoothness as measured above assumes that rating agencies or managers perceive smoothness as defined above. To mitigate the concern that this assumption could unduly influence results, we also use the correlation between change in abnormal accruals and change in pre-managed earnings (Tucker and Zarowin 2006) as an alternative measure of the extent of earnings smoothing. This measure does not rely on assumptions on the form of earnings volatility that is important to rating agencies or management. As long as management makes discretionary accruals to reduce high or increase low pre-managed earnings, this correlation captures smoothing activity. This second measure is denoted as SMOOTHACT2.

Another concern about our first measure of earnings smoothing activity is related to the estimation of discretionary accruals. Kothari et al. (2005) point out that the models used in the literature to estimate discretionary accruals are misspecified, especially for firms with extreme performance. Discretionary accruals are over-estimated (under-estimated) for firms with extremely good (bad) performance. The majority of our sample firms do not have extreme performance, and our earnings smoothness is a multi-year measure, so the effect of this misspecification is unlikely to be systematic and bias the results. Nonetheless, we use performance-matched discretionary accruals in measuring earnings smoothing activity. This measure is denoted as SMOOTHACT3.

Models (1) and (2) below test H1. Model (1) tests for differences in earnings smoothing activity for firms with either a plus or minus notch within a broad rating category versus those in the middle notch. Model (2) distinguishes firms with plus notches from those with minus notches. The models are:

SMOOTHACTjt = β0 + β1D\_CHGt-1 + ∑βiCONTROLi + ε (1)

SMOOTHACTjt = β0 + β1DPLUSRt-1 + β2DMINUSRt-1 + ∑βiCONTROLi + ε (2)

Where [COMPUSTAT item numbers in brackets]:

SMOOTHACTjt = the extent of earnings smoothing activity, proxied by the following three measures (j=1, 2, or 3).

SMOOTHACT1t = the first measure of SMOOTHACT, calculated as the difference between smoothness based on reported earnings (SMOOTHt) and smoothness based on earnings adjusted for discretionary accruals (SMOOTHXEM1t). SMOOTHt and SMOOTHXEM1t are defined below. Discretionary accruals (DA) are estimated based on the modified Jones’ (1991) model below.

SMOOTHt = the standard deviation of earnings before extraordinary and discontinued items for the most recent five years divided by the standard deviation of cash flow from operating activities for the most recent five years [(-1)\*s.d.(data123 for years t-4 to t) / s.d.(data308 for years t-4 to t)].[[15]](#footnote-16)

DAt = discretionary accruals, measured as the difference between total accruals and the estimated non-discretionary accruals. The non-discretionary accruals model is estimated for each year and 2-digit SIC industry, based on equation (3) below. Each firm-year’s non-discretionary accruals are then calculated based on equation (4).

SMOOTHXEM1t = earnings smoothness adjusted for discretionary smoothing activities, measured as [(­1)\*s.d.((data123-DA) for years t-4 to t)/s.d.(data308 for years t-4 to t)]. Both earnings and cash flows are scaled by lagged total assets.[[16]](#footnote-17)

SMOOTHACT2t = the second measure of SMOOTHACT, calculated as the correlation between change in discretionary accruals and change in earnings adjusted for discretionary accruals (DA).

SMOOTHACT3t = the third measure of SMOOTHACT, calculated the same as the first, except that in measuring SMOOTHXEM3t, it employs performance-matched discretionary accruals, following Kothari et al. (2005).

SMOOTHXEM3t = earnings smoothness measured the same as SMOOTHXEM1t except that it employs performance-matched discretionary accruals. Each sample firm is matched with a control firm on year, industry membership based on two-digit SIC, and return on asset. The difference in DA between each pair of sample and control firms is performance-matched discretionary accruals.[[17]](#footnote-18)

*Total Accrualst = α0 + α1 + α2ΔSales*t *+ α3Property Plant and Equipmentt*+ *ε* (3)

*Non-discretionary Accrualst = ++(ΔSales*t *- ΔAccount Receivables*t*) +*

*Property Plant and Equipmentt* + *ε* (4)

*Total Accruals*t is the difference between income before extraordinary items (data 123) and operating cash flows before extraordinary item (data308-data124). All variables except the intercept (*α0*) are deflated with total assets at the beginning of the year.

D\_CHGt-1 =1 for firms whose prior year credit ratings are in the top or bottom category within a broad rating, and 0 otherwise. Firms whose credit ratings are designated with a plus or a minus notch within a broad rating are considered to be in the top or bottom category, respectively [D\_CHGt-1 = 1 if data280 in prior year equals 4, 6, 7, 9, 10, 12, 13, 15, 16, 18, 19, or 21].

DPLUSRt-1 = 1 for firms whose prior year credit ratings are in the top category within a broad rating, i.e., credit rating designated with a plus notch, and 0 otherwise [DPLUSRt-1 = 1 if data280 in prior year equals 4, 7, 10, 13, 16 or 19].

DMINUSRt-1 = 1 for firms whose credit ratings are in the bottom category within a broad rating, i.e., credit rating designated with a minus notch, and 0 otherwise [DMINUSRt-1 = 1 if data280 equals 6, 9, 12, 15, 18, or 21].

CONTROL = control variables that proxy for earnings management capacity (NOAt-1) and incentives unrelated to credit rating changes (BMt, DEISSt+1, LNSALESt, and ROAt), and three sets of binary variables for broad credit rating category, annual fiscal year, and two-digit SIC code. These variables are described in the text below.

In the empirical tests, to mitigate concerns about the undue influence of extreme observations, we employ the ranks of SMOOTHACT1t and SMOOTHACT3t and deciles of SMOOTHACT2t. Ranks are divided by the number of observations so that the final values fall between zero and one.

Due to the inter-temporal nature of discretionary accruals, firms that have engaged in the greatest extent of earnings management in the past would lack the ability to further manage accruals. We use net operating assets (NOAt-1) to proxy for cumulative accounting management and control for firms’ accounting discretion flexibility (Barton and Simko 2002). It is measured at the beginning of the year as net operating assets scaled by lagged sales (data12), i.e., the sum of shareholders’ equity (data216) and total debt (data9 + data34) minus cash and marketable securities (data1). We also include four measures of earnings management incentives unrelated to bond ratings. Book-to-market ratio (BMt) proxies for growth. It controls for a possible stronger incentive of growth firms to manage earnings in order to avoid negative earnings surprises (Skinner and Sloan 1999). The variable DEISSt+1 is a dummy variable that equals *1* when the amount of bond and equity issuance net of payment and repurchase in year t+1 is above the median of all firm-years that report a net issue of debt or equity, and *0* otherwise. It controls for incentives to manage earnings associated with equity or bond issuance. The logarithm of sales (LNSALESt) controls for larger firms’ earnings smoothing activity induced by political cost concerns (Watts and Zimmerman 1990).[[18]](#footnote-19)

Because models (1) and (2) are designed to examine earnings smoothing behavior of firms with a plus or minus notch rating relative to other firms in the same broad rating category, we include dummy variables for broad credit rating categories to control for differences in smoothing activity across broad categories. In addition, Jorion et al. (2008) find that bond issuers’ earnings management activity changes over time. We include year dummies to control for this phenomenon. We also include dummy variables for SIC code to control for variation in earnings smoothing activity across industries. Inclusion of these two sets of binary variables mitigates concerns about certain years/industries driving our results. Finally, we employ clustered standard errors approach to mitigate concerns that the residuals may be correlated over time (Petersen 2009).

A positive β1 in model (1) would provide overall support for hypothesis H1. By examining firms with plus and minus notch ratings separately, as in model (2), we can investigate differences in earnings smoothing activity for firms that are trying to encourage upgrades (i.e., those with a plus notch) or discourage downgrades (i.e., those with a minus notch). We predict a positive sign for both β1 and β2 in model (2).

**3.2 Research design for tests of H2**

Hypothesis H2 predicts that among companies near a rating change, those with a greater need for future debt financing are more likely to smooth earnings. Models (5) and (6) below are used to investigate the hypothesis.

SMOOTHACTjt = β0 + β1D\_CHGHLEVt-1 + β2D\_CHGLLEVt-1 + ∑βiCONTROLi + ε (5)

SMOOTHACTjt = β0 + β1D\_PLUSRHLEVt-1 + β2D\_PLUSRLLEVt-1 +

β3D\_MINUSRHLEVt-1 + β4D\_MINUSRLLEVt-1 + ∑βiCONTROLi + ε (6)

Where [COMPUSTAT item numbers in brackets]:

D\_CHGHLEVt-1 = 1 for firms with D\_CHGt-1 at 1 and a leverage ratio above the median leverage for all firms with D\_CHGt-1 at 1, and 0 otherwise. Leverage ratio is defined as long-term debt divided by lagged total assets [data9 / lagged data6].

D\_CHGLLEVt-1 = 1 for firms with D\_CHGt-1 at 1 and a leverage ratio below or at the median leverage for all firms with D\_CHGt-1 at 1, and 0 otherwise.

D\_PLUSRHLEVt-1 and D\_PLUSRLLEVt-1 (D\_MINUSRHLEVt-1 and D\_MINUSRLLEVt-1)are defined analogously to D\_CHGHLEVt-1 and D\_CHGLLEVt-1, but are for firms with a plus (minus) notch.

We use the leverage ratio to proxy for the extent of reliance on debt financing. Leverage is used by Bushee and Leuz (2005) to proxy for overall financing needs. In addition, Lemmon et al. (2008) document that capital structure (i.e., leverage ratio) is very stable over time. Due to an unobserved time-invariant effect, firms with higher (lower) leverage ratios tend to maintain higher (lower) leverage ratios even after 20 years. Stable leverage implies that firms with higher leverage ratios are more affected by changes in credit ratings because they continue to rely more on debt financing in future years.

Kisgen (2006) finds that firms near rating changes manage their net debt issuance to a greater extent than other firms. Thus, in defining high versus low leverage, we use the median leverage of firms near rating changes instead of all sample firms. We thus categorize firms as having high (low) financing needs if the firm’s leverage is above (below or at) the median for all firms near rating changes. Hypothesis H2 would be supported with a finding of β1 > β2 in model (5), and β1 > β2 and/or β3 > β4 in model (6).

**3.3 Research design for tests of H3**

H3 investigates the relation between changes in earnings smoothness and the probability of future rating changes. We test hypothesis H3 with ordered probit models (7) and (8) that examine the impact of change in smoothness on the likelihood of subsequent credit rating downgrades and upgrades. Model (7) employs total change in smoothness (∆SMOOTH) while model (8) decomposes ∆SMOOTH into ∆SMOOTHXEM and ∆SMOOTHACT to examine whether the rating agencies distinguish the former (i.e., changes in smoothness due to changes in underlying economic performance) from the latter (i.e., changes in smoothness due to discretionary smoothing activities).

RTGCHGt+1 = β0 + β1∆SMOOTHt + β2D\_POSt · ∆SMOOTHt + β3D\_POSt +

∑βi∆CONTROLi + ε (7)

RTGCHGt+1 = β0 + β1∆SMOOTHXEMjt + β2D\_POSt · ∆SMOOTHXEMjt +

β3∆SMOOTHACTjt + β4D\_POSt · ∆SMOOTHACTjt + β5D\_POSt + ∑βi∆CONTROLi + ε (8)

Where,

RTGCHGt+1 = 3 if an issuer’s credit rating is upgraded, 2 if not changed, and 1 if downgraded in the subsequent year.

D\_POSt = 1 if ROAt improves from the prior year, and 0 otherwise. ROAt is defined as earnings before extraordinary and discontinued items divided by total assets at the beginning of the year [data123/lagged data6].

∆SMOOTHt = rank of change in SMOOTHt, i.e., earnings smoothness based on reported earnings as defined in model (1).

∆SMOOTHXEMjt = rank of change in SMOOTHEXMjt (j=1 or 3), i.e., earnings smoothness based on earnings adjusted for discretionary accruals as defined in model (1).

∆SMOOTHACTjt = rank of change in SMOOTHACTjt (j=1, 2, or 3), i.e., the extent of discretionary earnings smoothing activity as defined in model (1).

∆CONTROL = binary variables for annual fiscal years and one-digit SIC codes, annual changes of leverage (∆LEVt), revenue (∆SALESt), free cash flows (∆FCFt), capital intensity (∆PPEt), firm size (∆SIZEt), and interest coverage (∆INT\_COVt).[[19]](#footnote-20)

LEV = long-term debt divided by lagged total assets [data9 / lagged data6].

SALES = sales divided by lagged total assets [data12 / lagged data6].

FCF = cash flow from operating activities minus average capital expenditure over current and past two years divided by lagged total assets [(data308-average of data128) / lagged data6].

PPE = gross PPE divided by lagged total assets [data7 / lagged data6].

SIZE = natural log of total assets [data6].

INT\_COV = operating income before depreciation divided by interest expense [data13 / data15].

Similar to previous models, models (7) and (8) use the rank of ∆SMOOTHt and ranks of ∆SMOOTHXEMjt and ∆SMOOTHACTjt, respectively, rather than the continuous measures to mitigate undue influence of extreme values and to reflect a possible nonlinear relation. In the models, D\_POSt controls the impact of performance changes in the rating revision process. While performance changes likely have an impact on income smoothing, higher volatility caused by earnings improvements presumably will not decrease (increase) the likelihood of an upgrade (downgrade). We therefore interact D\_POSt with ∆SMOOTHt in model (7) and both ∆SMOOTHXEMjt and ∆SMOOTHACTjt in model (8) and expect the interaction terms to have signs opposite from the coefficients on ∆SMOOTHt, ∆SMOOTHXEMjt, and ∆SMOOTHACTjt. Based on prior research (e.g., Ashbaugh-Skaife et al. 2006) and the rating methodologies of S&P and Moody’s, both models also include changes in leverage, sales, free cash flows, capital intensity, firm size, and interest coverage as controls. Decreases in free cash flow, sales, and interest coverage, and increase in leverage proxy for higher default risk. Larger firm size and higher capital intensity represent lower risk.

**4. Sample, descriptive statistics, and empirical results**

**4.1. Sample and descriptive statistics**

The sample includes all bond issuers available in COMPUSTAT from 1990 to 2005 that are not in the utility or financial industries.[[20]](#footnote-21) Sample firms are required to have a credit rating by S&P ranging from AA+ to CCC- and necessary COMPUSTAT data used in calculating measures of earnings smoothing activities and control variables. We eliminate bond issuers in industries with fewer than ten annual observations to estimate the modified Jones (1991) model. Variables used in estimating the non-discretionary level of accruals are winsorized at three standard deviations by each year (e.g., Tucker and Zarowin 2006). For our main tests, the final sample ranges from 8,542 (when SMOOTHACT2 is used) to 9,437 (when SMOOTHACT3 is used) firm-year observations.

Panel A of table 1 lists the sample distribution by fiscal year and panel B presents the sample distribution and the mean/median extent of smoothing (SMOOTHACTj) by credit rating. Panel A shows that the number of observations is gradually increasing over time from 1990 to 2005. Only ratings B+ and BBB represent 10 percent or more of the sample, with 11.8% and 10.0%, respectively. Overall, the sample distribution across the rating categories shows that any results are unlikely to be driven by a single rating category. Panel B also displays the relative extent of earnings smoothing activities (SMOOTHACTj) based on all three measures by credit ratings. Within the same broad rating category, in general, firms with a plus or minus notch tend to smooth earnings to a larger extent than those in the middle notch. This tendency is more pronounced within investment grade firms.

Panel C of table 1 presents the mean, median, and standard deviation of each variable used in the tests for the three groups: the total sample, firms that have a middle notch rating, and firms that have a plus or minus notch rating. The sample has a wide distribution in all variables except binary variables of UPGRADED (with value 1 for firms experiencing an upgrade) and DOWNGRADED (with value 1 for firms experiencing a downgrade), as reflected in the large standard deviations. Between the two subgroups, firms in the middle notch are involved in significantly less earnings smoothing activity relative to firms with a plus or minus notch rating. The middle-notch firms also have lower book-to-market ratios, larger sales, lower net operating assets, and lower likelihood of being upgraded compared to the outer-notch firms.

Figure 1 depicts the relative extent of earnings smoothing activities based on both the mean and median of SMOOTHACT1 (which uses discretionary accruals estimated from the modified Jones (1991) model) within each broad category, respectively. Out of the six broad rating categories, four in both panels show the predicted pattern, in which observations near a broad rating change smooth their earnings to a larger extent than do other firms in the same rating category. This, together with table 1 provides preliminary support for H1. In the figures, the solid line divides the categories into investment grade (to the left) and speculative grade (to the right). The patterns for speculative-grade observations are inconsistent with H1 for the B rating category and the minus notch of CCC rating category. It thus appears that smoothing behavior may differ for investment- versus speculative-grade categories.[[21]](#footnote-22)

To show that the pattern of SMOOTHACTt we observe in figure 1 is not driven by cash flow smoothing, in figure 2, we separately display the volatility of earnings and cash flows in panels A and B, respectively. Figure 2 does not exhibit the same pattern as figure 1. This demonstrates that the greater extent of earnings smoothing in firms with a minus or a plus notch that is depicted in figure 1 is not caused by cash flow volatility. Overall, figures 1 and 2 show that firms near broad rating changes smooth earnings to a larger extent than other firms and this pattern is not driven by cash flow volatility.

**4.2. Extent of earnings smoothing**

Multivariate regressions based on models (1) and (2) control for variation in discretionary accruals by rating category, year, industry, earnings management capacity, and incentives unrelated with maintaining or improving credit ratings. Panels A, B, and C of table 2 present results for all three measures of SMOOTHACTj. SMOOTHACT1 for panel A is based on discretionary accruals estimated from the modified Jones (1991) model. The coefficient on the dummy variable for firms with a plus or minus notch rating, D\_CHGt-1, is significantly positive, consistent with firms in this group engaging in significantly greater extent of earnings smoothing. Further, this difference in earnings smoothing activities is present in both firms with a plus notch rating and those with a minus notch rating relative to middle notch firms, as reflected in the positive coefficients on DPLUSRt-1 and DMINUSRt-1 in model (2).

Results in panel B are based on SMOOTHACT2, measured as decile of the correlation between change in discretionary accruals and change in pre-managed earnings. We employ ordered probit approach to estimate models (1) and (2). Results are consistent with those in panel A, albeit somewhat weaker for the coefficient on DPLUSRt-1. Thus, our results are robust to the form of earnings smoothness as defined above. Panel C of table 2 presents results of estimating models (1) and (2) with SMOOTHACT3, measured based on performance-matched discretionary accruals. The results are consistent with those in panel A except that the coefficient on DMINUSRt-1 becomes insignificant.[[22]](#footnote-23)

Overall, the results are consistent with the general patterns described in table 1 and figure 1 and support H1 that firms with ratings near a broad rating change smooth earnings to a significantly larger degree than other firms in the same broad rating category.

**4.3. Extent of earnings smoothing by debt financing needs**

Table 3 presents results for models (5) and (6). To test H2, we compare the coefficients on *D\_CHG*t-1, *D\_PLUSR*t-1, and *D\_MINUSR*t-1 for firms with high versus low leverage. Panel B of table 3 reports p-values of F-tests on differences in the coefficients between the two groups. Results of model (5) using both the second and third measures of SMOOTHACTjt show that among firms near rating changes, those with higher leverage smooth earnings to a greater extent, as reflected in both the magnitude and statistical significance of the coefficients on *D\_CHGHLEV*t-1 versus *D\_CHGLLEV*t-1.*.*In particular, the coefficients on *D\_CHGHLEV*t-1 (firms with higher leverage and near broad rating change) are significant at the 1% level while the coefficients on *D\_CHGLLEV*t-1 (firms with lower leverage and near broad rating change) are insignificant. When SMOOTHACT2 is used, the difference in the coefficients for *D\_CHGHLEV*t-1 versus *D\_CHGLLEV*t-1 is 0.060 with a p-value of 0.023. Estimation results based on SMOOTHACT3 are stronger; the difference in the coefficients on *D\_CHGHLEV*t-1 versus *D\_CHGLLEV*t-1 is 0.016 with a p-value of 0.016. However, when SMOOTHACT1 is used, the difference is insignificant (p-value = 0.19).

Results for model (6), which separates firms with plus versus minus notches, show that the difference is primarily driven by firms with minus notches. When SMOOTHACT1 is used for model (6), the coefficient on *D\_MINUSRHLEV*t-1 is greater than that on *D\_MINUSRLLEV*t-1 by 0.016 with a p-value of 0.051 while the coefficient on *D\_PLUSRHLEV*t-1 is not significantly different from that on *D\_PLUSRLLEV*t-1. Estimation results based on SMOOTHACT3 are more pronounced; the difference in the coefficients on *D\_MINUSRHLEV*t-1 versus *D\_MINUSRLLEV*t-1 is 0.026 with a p-value of 0.006 while the coefficient on *D\_PLUSRHLEV*t-1 is again not significantly different from that on *D\_PLUSRLLEV*t-1. However, when SMOOTHACT2 is used, coefficients on both *D\_PLUSRHLEV*t-1 and *D\_MINUSRHLEV*t-1 are greater than those on *D\_PLUSRLLEV*t-1 and *D\_MINUSRLLEV*t-1 by 0.058 and 0.068 with p-values of 0.079. Overall, the evidence in table 3 supports H2, that among firms near rating changes, those with higher debt financing needs engage in earnings smoothing activity to a larger extent than those with lower debt financing needs. The results are more pronounced for firms that are more likely to be downgraded to a lower broad rating category and thus face higher future borrowing costs.

**4.4. The impact of smoothness changes on the likelihood of credit rating changes**

Hypothesis H3 addresses the impact of smoothness changes on future credit rating changes. Regression results for model (7) are reported in panels A and C of table 4, where changes in smoothness can be calculated. Again, unlike SMOOTHACT1 and SMOOTHACT3 , SMOOTHACT2 does not have corresponding variables, ∆SMOOTHt and ∆SMOOTHXEMt. Results in table 4 indicate that, controlling for increases in ROAt (D\_POSr = 1), improvement in earnings smoothness decreases (increases) the likelihood of rating downgrades (upgrades).[[23]](#footnote-24) The results for model (8), which separates smoothing into discretionary and non-discretionary components, indicate that both components of earnings smoothness decrease (increase) the likelihood of rating downgrades (upgrades). The interaction terms for change in ROAt and change in smoothness are consistently opposite in sign to smoothness changes and significantly different from zero. Unreported chi-square tests show that the sums of the smoothing measures and their associated interaction terms are generally not significantly different from zero. This suggests that the impact of smoothing on future rating changes is not driven by the changes in smoothness associated with increases in ROAt. Results for SMOOTHACT2, reported in Panel B, are similar. Overall, the results in table 4 support H3 and indicate a significantly positive impact on future credit ratings of earnings smoothness for companies experiencing decreases in ROA.[[24]](#footnote-25)

**5. Supplemental tests**

**5.1. The absolute value of discretionary accruals as a measure of accounting discretion**

The literature employs the absolute magnitude of discretionary accruals (|DA|) to measure the extent of accounting discretion managers exert to report certain levels of earnings (e.g., Warfield, Wild, and Wild 1995; Frankel, Johnson, and Nelson 2002; Klein 2002; Bowen, Rajgopal, and Venkatchalam 2008). Following the literature and to gauge the magnitude of accounting discretion managers exert to arrive at desired earnings smoothness, we replace the measure of earnings smoothing activity with |DA| in our models as the dependent variable. The advantage of using |DA| is that it does not require any assumptions about the functional form of earnings smoothness used by management. As long as management engages in accruals management to improve earnings smoothness, the absolute amount of discretionary accruals will reflect earnings smoothing activity. The drawback of |DA| is that it is a one-year measure and does not fully correspond to the longer-term behavior inherent in earnings smoothing. Untabulated results for models (1) and (2) show that |DA| for firms with either a plus or a minus notch rating is larger than |DA| for firms in the middle notch, suggesting that managers of the former exert accounting discretion to a larger extent. Results for models (5) and (6) show that among firms with a plus or minus notch rating, |DA| does not vary with leverage. Although the coefficient on D\_PLUSRHLEV (firms with a plus notch rating and higher leverage) is significantly positive, its magnitude is not significantly different from that on D\_PLUSRLLEV (firms with a plus notch rating and lower leverage).[[25]](#footnote-26)

**5.2. Earnings smoothing activity by earnings thresholds**

This section examines earnings smoothing activity separately for firms that meet or beat earnings thresholds versus those that miss the same thresholds. This analysis would provide evidence on whether empirical evidence in Section 4, i.e., a larger extent of earnings smoothing for firms with greater incentives to maintain or improve their credit ratings, is conditional on surpassing earnings thresholds.

In the setting of an equity market, Kirschenheiter and Melumad (2002) analytically show that firms take a “big bath” when earnings are inferior and smooth earnings when earnings are superior. Their findings suggest that earnings smoothing activities may be more prevalent for firms that surpass earnings thresholds than for firms missing earnings thresholds. However, management’s tendency to engage in the two types of activities likely differs in debt markets. Unlike stockholders, creditors have a fixed claim to a firm’s value and do not share the upside growth potential (Fischer and Verrecchia 1997; Plummer and Tse 1999). Thus, creditors are more concerned about performance deterioration than growth (Jiang 2008), implying that the incentives to smooth earnings still exist even when earnings are inferior – e.g., when earnings miss a threshold.

Table 5 presents the results of estimating models (1) and (2) conditional on meeting/beating or missing three earnings thresholds – earnings increases, positive earnings, and meeting analysts’ expectation.[[26]](#footnote-27) For these tests, we report results only for our variables of interest. Panel A of table 5 shows results for models (1) and (2) for earnings increase and decrease subsamples. With the exception of firms with a minus notch rating that report an earnings increase, for both subsamples, firms near rating changes smooth earnings to a larger extent than others in the same broad rating category. This suggests that firms’ earnings smoothing decisions are not conditional on earnings changes. Results in Panel B for model (1) indicate that in both loss and profit firms, those near rating changes smooth earnings to a larger extent than others in the same broad rating category. Results for model (2) for these subsamples are mixed, however. Among loss firms, only those with minus notch ratings engage in more earnings smoothing activities than firms in the middle notch, while in the subsample of firms reporting positive earnings, only firms with plus notch ratings smooth earnings to a larger extent than other firms. Results reported in Panel C for meeting or beating versus missing analysts’ forecasts show that among firms missing analysts’ forecasts, only firms with plus notch ratings engage in more earnings smoothing activities than firms in the middle notch. For the subsample of firms meeting or beating analysts’ forecasts, firms with both plus and minus notch ratings engage in more earnings smoothing activities. In sum, our hypothesis that firms close to a rating change smooth earnings to a larger extent is generally supported irrespective of earnings thresholds, but the results are somewhat weaker for firms missing analysts’ forecasts.

We also investigate whether firms near rating changes are more likely to: (1) meet or beat the three earnings thresholds; and (2) engage in more income-increasing earnings management (i.e., higher magnitude of discretionary accruals) to achieve earnings targets. We find (in untabulated results) that firms near rating changes are not more likely to meet earnings thresholds nor to report a higher magnitude of signed discretionary accrual. A possible interpretation is that since meeting or beating earnings thresholds is more important in equity markets than in debt markets, the extent of income-increasing discretionary accruals to achieve earnings targets are similar to both firms near rating changes and the other firms in the same broad rating category. On the other hand, since the stock market rewards for smoother earnings path (e.g., lower cost of equity capital) are trivial (McInnis 2008), the difference in earnings smoothing activities between firms near rating changes and the other firms is more pronounced in the setting of debt markets.

**5.3. Difference in earnings smoothing between investment vs. speculative grade firms**

The descriptive statistics in table 1 and figure 1 suggest a different pattern between firms with investment-grade ratings and those with speculative-grade ratings. To incorporate this possible difference, we augment models (1) and (2) by including a dummy variable for speculative-grade and interacting the dummy variables with D\_CHG, DPLUSR, and DMINUSR. Untabulated results of the augmented models (1) and (2) show a larger extent of earnings smoothing activities for firms near rating changes within investment-grade ratings than for those within speculative-grade. In addition, when using only the investment-grade rating firms, the coefficients on D\_CHG, DPLUSR, and DMINUSR become larger.

We explore three plausible explanations for the weaker results among firms with non-investment grade ratings. First, the difference could be due to a higher likelihood of having a split rating for the non-investment grade firms. A split rating occurs when the rating agencies (e.g., S&P and Moody’s) assign different ratings to the same security. For example, for a firm which is assigned a plus (or minus) notch rating by both S&P and Moody’s, the incentive to improve (or maintain) credit ratings is presumably greater than that for a firm receiving a plus (or minus) notch rating by one rating agency, but a middle notch by the other agency. If non-investment grade firms are more likely to have split credit ratings by S&P and Moody’s due to more uncertain information environment of bond issuers than investment grade firms, weaker results for non-investment grade firms corroborate our findings in section 4. To investigate this possibility, we estimate how often Moody’s and S&P assign the same notch ratings. We find that based on FISD database, for investment grade ratings, more than 79% of bond issues are assigned the same notch ratings. On the other hand, for non-investment grade ratings, only 54% of bond issues have the same notch ratings by both rating agencies.[[27]](#footnote-28)

Second, weaker results for speculative grade firms could also be attributed to the fact that multiple-notch rating revisions are more likely within speculative grade ratings. Based on the FISD database, we find that 73 percent (55 percent) of bond issues within investment (non-investment) grade ratings are revised by one notch, suggesting that for firms with a middle notch rating, those in the non-investment grade are more likely to be downgraded or upgraded to the next broad rating category than those in the investment grade. This implies that the incentive to maintain or improve credit ratings is less distinct between firms near rating change and firms in the middle notch within the non-investment grade. This finding also corroborates our results in section 4. Third, accounting flexibility to manage earnings is higher for investment-grade firms due to the scale of their operations, which makes it easier to shift income across operations and time (Jorion et al. 2008). Therefore, although the incentive to smooth earnings to manage credit ratings also exists for the non-investment grade firms, the lack of accounting flexibility may constrain firms near rating changes from engaging in significantly larger extent of earnings smoothing than other firms.

**6. Conclusion**

The importance of credit ratings perceived by both the bond and stock market and, thus, by bond issuers, suggests the existence of incentives for bond issuers to improve or maintain their credit ratings. We investigate earnings smoothing as one way in which bond issuers affect credit ratings and argue that bond issuers with greater incentives to improve or maintain credit ratings will smooth earnings to a larger extent than other issuers. Further, we examine whether these incentives are stronger for firms that rely more on the debt market for financing. Finally, we analyze whether bond issuers’ earnings smoothing activity is effective at changing the likelihood of subsequent rating upgrades or downgrades.

Drawing on the literature and empirical evidence provided in the appendix to this study, we categorize bond issuers whose credit ratings have a plus or minus notch as having greater incentives to improve or maintain bond ratings. We find that earnings smoothing via earnings management is more concentrated in these firms. Among the group of firms with a plus or minus notch rating, those with higher debt financing needs smooth earnings to a larger extent than others. Our results are robust to including other factors that influence earnings management and additional sensitivity tests. In addition, we find that controlling for earnings smoothness related to an increase in ROAt, earnings smoothing activity indeed increases (decreases) the likelihood of a subsequent rating upgrade (downgrade). Thus, it appears that earnings smoothing activity can be used as a tool to manage credit ratings.

This paper provides fresh empirical evidence on the earnings smoothing incentives of firms that participate in the public debt market. It is among the first to examine a setting where we can identify companies that have stronger incentives to manage earnings to affect debt ratings. We empirically document that rather than being ubiquitous, earnings smoothing activities vary significantly with these incentives. Our results also suggest that not only do managers smooth earnings to influence credit ratings, but also that credit rating agencies do not fully compensate for such smoothing in their credit rating decisions.

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| **Table 1: Distribution of Sample by Fiscal Years and Credit Ratings** | | | | | | | | |
| **Panel A: Distribution by fiscal year** | | | | | | | | |
|  |  |  |  |  |  |  |  |  |
| Year | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 |
| N | 115 | 490 | 542 | 533 | 519 | 538 | 592 | 610 |
| Percent | 1.110 | 4.710 | 5.210 | 5.120 | 4.990 | 5.170 | 5.690 | 5.860 |
|  |  |  |  |  |  |  |  |  |
| Year | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
| N | 646 | 657 | 716 | 828 | 903 | 934 | 927 | 852 |
| Percent | 6.210 | 6.320 | 6.880 | 7.960 | 8.680 | 8.980 | 8.910 | 8.190 |
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| **Panel B: Earnings smoothing activities by credit ratings** | | | | | | | | |
| Rating | N for SMOOTHACT1t | Percent for SMOOTHACT1t | Mean SMOOTHACT1t | Median SMOOTHACT1t | Mean SMOOTHACT2t | Median SMOOTHACT2t | Mean SMOOTHACT3t | Median SMOOTHACT3t |
| AA+ | 66 | 0.6% | 0.559 | 0.575 | 0.495 | 0.444 | 0.566 | 0.559 |
| AA | 274 | 2.6% | 0.429 | 0.370 | 0.391 | 0.333 | 0.464 | 0.458 |
| AA- | 313 | 3.0% | 0.485 | 0.462 | 0.472 | 0.444 | 0.531 | 0.532 |
| A+ | 571 | 5.5% | 0.528 | 0.521 | 0.534 | 0.556 | 0.554 | 0.568 |
| A | 935 | 9.0% | 0.499 | 0.472 | 0.501 | 0.444 | 0.500 | 0.488 |
| A- | 737 | 7.1% | 0.523 | 0.514 | 0.515 | 0.444 | 0.515 | 0.514 |
| BBB+ | 861 | 8.3% | 0.534 | 0.555 | 0.536 | 0.556 | 0.517 | 0.518 |
| BBB | 1041 | 10.0% | 0.505 | 0.496 | 0.497 | 0.444 | 0.487 | 0.483 |
| BBB- | 888 | 8.5% | 0.534 | 0.556 | 0.536 | 0.556 | 0.524 | 0.544 |
| BB+ | 595 | 5.7% | 0.510 | 0.521 | 0.512 | 0.556 | 0.491 | 0.485 |
| BB | 841 | 8.1% | 0.478 | 0.466 | 0.476 | 0.444 | 0.502 | 0.498 |
| BB- | 1004 | 9.7% | 0.518 | 0.545 | 0.513 | 0.556 | 0.501 | 0.518 |
| B+ | 1224 | 11.8% | 0.466 | 0.461 | 0.468 | 0.444 | 0.480 | 0.478 |
| B | 612 | 5.9% | 0.474 | 0.482 | 0.465 | 0.444 | 0.464 | 0.439 |
| B- | 234 | 2.2% | 0.444 | 0.455 | 0.465 | 0.444 | 0.450 | 0.430 |
| CCC+ | 108 | 1.0% | 0.474 | 0.528 | 0.565 | 0.556 | 0.470 | 0.511 |
| CCC | 67 | 0.6% | 0.434 | 0.432 | 0.516 | 0.556 | 0.453 | 0.481 |
| CCC- | 31 | 0.3% | 0.381 | 0.355 | 0.467 | 0.389 | 0.441 | 0.447 |

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| **Panel C: Descriptive statistics of variables** | | | | | | | | | | | | | | |
|  | Total sample | | | |  | Firms in the middle notch (D\_CHG=0) | | | |  | Firms with a plus/minus notch (D\_CHG=1) | | | |
| Variable | N | Mean | Median | S.D. |  | N | Mean | Median | S.D. |  | N | Mean | Median | S.D. |
| SMOOTHACT1t | 10402 | 0.500 | 0.500 | 0.289 |  | 3770 | 0.486\*\*\* | 0.473 | 0.289 |  | 6632 | 0.508 | 0.516 | 0.288 |
| SMOOTHACT2t | 8634 | 0.500 | 0.500 | 0.319 |  | 3191 | 0.481\*\*\* | 0.444 | 0.321 |  | 5443 | 0.511 | 0.556 | 0.318 |
| SMOOTHACT3t | 10491 | 0.500 | 0.500 | 0.289 |  | 3794 | 0.488\*\*\* | 0.481 | 0.289 |  | 6697 | 0.507 | 0.512 | 0.289 |
| BMt | 9400 | 0.380 | 0.434 | 1.410 |  | 3469 | 0.334\*\* | 0.421 | 1.570 |  | 5931 | 0.407 | 0.439 | 1.307 |
| LNSALESt | 10392 | 7.688 | 7.630 | 1.442 |  | 3766 | 7.830\*\*\* | 7.800 | 1.462 |  | 6626 | 7.607 | 7.538 | 1.425 |
| DEISSt+1 | 10402 | 0.169 | 0.000 | 0.375 |  | 3770 | 0.175 | 0.000 | 0.380 |  | 6632 | 0.166 | 0.000 | 0.372 |
| NOAt-1 | 10383 | 0.863 | 0.633 | 0.788 |  | 3760 | 0.828\*\*\* | 0.617 | 0.736 |  | 6623 | 0.882 | 0.641 | 0.816 |
| UPGRADED | 9199 | 0.075 | 0.000 | 0.263 |  | 3357 | 0.063\*\*\* | 0.000 | 0.243 |  | 5842 | 0.082 | 0.000 | 0.274 |
| DOWNGRADED | 9199 | 0.123 | 0.000 | 0.328 |  | 3357 | 0.117 | 0.000 | 0.321 |  | 5842 | 0.126 | 0.000 | 0.332 |
| ΔLEVt | 9199 | -0.008 | -0.009 | 0.223 |  | 3357 | -0.006 | -0.007 | 0.246 |  | 5842 | -0.010 | -0.009 | 0.208 |
| ΔSALESt | 9199 | -0.005 | 0.009 | 0.357 |  | 3357 | -0.005 | 0.007 | 0.381 |  | 5842 | -0.005 | 0.009 | 0.343 |
| ΔFCFt | 8997 | 0.003 | 0.002 | 0.076 |  | 3272 | 0.002 | 0.002 | 0.085 |  | 5725 | 0.003 | 0.002 | 0.071 |
| D\_POSt | 9199 | 0.532 | 1.000 | 0.499 |  | 3357 | 0.533 | 1.000 | 0.499 |  | 5842 | 0.531 | 1.000 | 0.499 |
| ΔPPEt | 9199 | -0.005 | 0.006 | 0.231 |  | 3357 | -0.004 | 0.004 | 0.232 |  | 5842 | -0.005 | 0.007 | 0.230 |
| ΔSIZEt | 9199 | 0.060 | 0.041 | 0.216 |  | 3357 | 0.060 | 0.044 | 0.211 |  | 5842 | 0.061 | 0.040 | 0.219 |
| ΔINT\_COVt | 9054 | 1.468 | 0.263 | 74.522 |  | 3305 | 0.409 | 0.273 | 34.241 |  | 5749 | 2.078 | 0.260 | 89.843 |
| ΔROAt | 9199 | 0.000 | 0.002 | 0.086 |  | 3357 | 0.001 | 0.002 | 0.083 |  | 5842 | 0.000 | 0.002 | 0.088 |

Note:

\*\*\*, \*\*, and \* denote that the difference of the mean between firms with a plus or minus notch rating and those with a middle notch rating is significant at 0.01, 0.05, and 0.10, respectively.

D\_CHGt-1=1 if data280 equals to 4, 6, 7, 9, 10, 12, 13, 15, 16, 18, 19, or 21, and 0 otherwise.

SMOOTHACT1t = the first measure of SMOOTHACT, calculated as the difference between smoothness based on reported earnings (SMOOTHt) and

smoothness based on earnings adjusted for discretionary accruals (SMOOTHXEM1t). SMOOTHt = the standard deviation of earnings before

extraordinary and discontinued items for the most recent five years divided by the standard deviation of cash flow from operating activities for the most

recent five years [(-1)\*s.d.(data123 for years t-4 to t) / s.d.(data308 for years t-4 to t)]. SMOOTHXEM1t = earnings smoothness adjusted for

discretionary smoothing activities, measured as [(­1)\*s.d.((data123-DA) for years t-4 to t) / s.d.(data308 for years t-4 to t)]. Both earnings and cash

flows are scaled by lagged total assets.

DAt = discretionary accruals, measured as the difference between total accruals and the estimated non-discretionary accruals. The non-discretionary accruals

model is estimated for each year and 2-digit SIC industry, based on the equation below.

*Total Accrualst = α0 + α1 + α2ΔSales*t *+ α3Property Plant and Equipmentt*+ *ε*

*Total Accruals*t is the difference between income before extraordinary items (data 123) and operating cash flows before extraordinary item

(data308-data124). All variables except the intercept (*α0*) are deflated with total assets at the beginning of the year.

Each firm-year’s *Non-discretionary Accrualst = ++(ΔSales*t *- ΔAccount Receivables*t*) + Property Plant and Equipmentt* + *ε*

SMOOTHACT2t = the second measure of SMOOTHACT, calculated as the correlation between change in discretionary accruals and change in earnings adjusted

for discretionary accruals (DA).

SMOOTHACT3t = the third measure of SMOOTHACT, calculated the same as the first, except that in measuring SMOOTHXEM3t, it employs

performance-matched discretionary accruals, following Kothari et al. (2005). SMOOTHXEM3t is measured the same as SMOOTHXEM1t except that it

employs performance-matched discretionary accruals. Each sample firm is matched with a control firm on year, industry membership based on two-digit

SIC, and return on asset. The difference in DA between each pair of sample and control firms is performance-matched discretionary accruals.

NOAt-1 = net operating assets scaled by lagged sales, measured at the beginning of the year as [shareholders’ equity (#216) - cash and marketable securities (#1) + total debt (#9 + #34)] / sales (#12).

BMt = book-to-market ratio, measured as data60 / (data199\*data25).

DEISSt+1= 1 if the amount of net bond and equity issuance in year t+1 is above the sample median, and 0 otherwise. Net bond and equity issuance is measured as [((data111-data114+data301) + (data108-data115)) / data6].

LNSALESt = the logarithm of sales (data12).

ROAt = earnings before extraordinary and discontinued items divided by total assets [data123/lagged data6].

D\_POSt = 1 if ROA increases from last year, and 0 otherwise. ROAt is defined as earnings before extraordinary and discontinued items divided by total assets at the beginning of the year [data123/lagged data6].

ΔLEVt = change in long-term debt divided by total assets [data9 / data6].

ΔSALESt = change in sales revenue scaled by lagged total assets [data12 / lagged data6].

ΔFCFt = change in free cash flow scaled by lagged total assets. Free cash flow is measured as cash flow from operating activities minus average capital expenditure over current and the past two years [(data308-average of data128) / lagged data6].

ΔPPEt = change in gross PPE divided by lagged total assets [data7 / lagged data6].

ΔSIZEt = change in natural log of total assets [data6].

ΔINT\_COVt = change in operating income before depreciation divided by interest expense [data13 / data15].

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| **Table 2: Regression of the Extent of Smoothing on Credit Ratings** | | | | | | | | | | | | | | | |
| Dependent Variable | |  | | SMOOTHACT1t | | | | SMOOTHACT2t | | | | SMOOTHACT3t | | | |
|  | Independent variables | Pred. | | Model (1) | | Model (2) | | Model (1) | | Model (2) | | Model (1) | | Model (2) | |
| Sign | | Coeff | *p* | Coeff | *p* | Coeff | *p* | Coeff | *p* | Coeff | *p* | Coeff | *p* |
|  | INTERCEPT |  | | 0.006 | 0.942 | 0.017 | 0.846 | 0.904 | <.0001 | 0.880 | <.0001 | 0.047 | 0.654 | 0.063 | 0.553 |
|  | D\_CHGt-1 | + | | 0.015 | 0.008 |  |  | 0.037 | 0.054 |  |  | 0.013 | 0.022 |  |  |
|  | DPLUSRt-1 | + | |  |  | 0.020 | 0.003 |  |  | 0.026 | 0.177 |  |  | 0.021 | 0.003 |
|  | DMINUSRt-1 | + | |  |  | 0.010 | 0.087 |  |  | 0.049 | 0.038 |  |  | 0.006 | 0.228 |
|  | D\_At-1 |  | | 0.027 | 0.056 | 0.025 | 0.080 | 0.090 | 0.071 | 0.095 | 0.059 | 0.007 | 0.658 | 0.004 | 0.814 |
|  | D\_BBBt-1 |  | | 0.010 | 0.476 | 0.007 | 0.631 | 0.098 | 0.056 | 0.105 | 0.044 | -0.026 | 0.107 | -0.031 | 0.059 |
|  | D\_BBt-1 |  | | -0.010 | 0.538 | -0.013 | 0.420 | 0.028 | 0.625 | 0.035 | 0.543 | -0.032 | 0.078 | -0.037 | 0.044 |
|  | D\_Bt-1 |  | | -0.029 | 0.106 | -0.036 | 0.058 | 0.001 | 0.990 | 0.016 | 0.806 | -0.049 | 0.015 | -0.059 | 0.005 |
|  | D\_CCCt-1 |  | | -0.039 | 0.196 | -0.047 | 0.135 | -0.011 | 0.916 | 0.005 | 0.963 | -0.055 | 0.096 | -0.066 | 0.050 |
|  | BMt |  | | 0.003 | 0.131 | 0.003 | 0.146 | 0.002 | 0.532 | 0.002 | 0.526 | 0.003 | 0.250 | 0.002 | 0.281 |
|  | LNSALESt |  | | 0.015 | <.0001 | 0.014 | <.0001 | 0.003 | 0.783 | 0.005 | 0.689 | 0.016 | <.0001 | 0.015 | <.0001 |
|  | DEISSt+1 |  | | -0.002 | 0.811 | -0.001 | 0.828 | 0.003 | 0.927 | 0.002 | 0.936 | -0.003 | 0.666 | -0.003 | 0.693 |
|  | NOAt-1 |  | | 0.031 | <.0001 | 0.031 | <.0001 | 0.007 | 0.213 | 0.007 | 0.219 | 0.028 | <.0001 | 0.028 | <.0001 |
|  | Control for firm clustering | | | Yes |  | Yes |  | Yes |  | Yes |  | Yes |  | Yes |  |
|  | Industry effects | |  | Yes |  | Yes |  | Yes |  | Yes |  | Yes |  | Yes |  |
|  | Year effects | |  | Yes |  | Yes |  | Yes |  | Yes |  | Yes |  | Yes |  |
|  | N | |  | 9373 |  | 9373 |  | 8542 |  | 8542 |  | 9437 |  | 9437 |  |
|  | Likelihood Ratio | |  |  |  |  |  | 503.20 |  | 503.80 |  |  |  |  |  |
|  | R2 | |  | 46% |  | 46% |  |  |  |  |  | 39% |  | 39% |  |

Note: All *p* values are based on the two-tailed *t*-statistic except those on variables with predicted signs: D\_CHGt-1, DPLUSRt-1, and DMINUSRt-1. For these variables, p values are based on one-tailed *t*-statistic.

D\_CHGt-1=1 if data280 equals to 4, 6, 7, 9, 10, 12, 13, 15, 16, 18, 19, or 21, and 0 otherwise. DPLUSRt-1 = 1 if data280 equals to 4, 7, 10, 13, 16 or 19, and 0 otherwise. DMINUSRt-1 = 1 if data280 equals to 6, 9, 12, 15, 18, or 21. D\_At-1 = 1 for firms with a credit rating of A (including A+, A, and A-), and 0 otherwise. D\_BBBt-1, D\_BBt-1. D\_Bt-1. and D\_CCCt-1 are defined similarly. Other variables are defined the same as in table 1.

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| **Table 3: Extent of Smoothing by Financing Needs** **(*p* value in parenthesis)** | | | | | | | |  |  |  |  |  |  |
| Dependent variable |  | SMOOTHACT1t | | | | SMOOTHACT2t | | | | SMOOTHACT3t | | | |
| Independent variables | Pred. Sign | Model (5) | | Model (6) | | Model (5) | | Model (6) | | Model (5) | | Model (6) | |
| Coeff | *p* | Coeff | *p* | Coeff | *p* | Coeff | *p* | Coeff | *p* | Coeff | *p* |
| **Panel A: Regression results** | | | | | |  |  |  |  |  |  |  |  |
| INTERCEPT |  | 0.007 | 0.936 | 0.018 | 0.830 | 0.903 | <.0001 | 0.883 | <.0001 | 0.049 | 0.643 | 0.066 | 0.530 |
| D\_CHGHLEVt-1 | + | 0.018 | 0.006 |  |  | 0.069 | 0.008 |  |  | 0.022 | 0.002 |  |  |
| D\_CHGLLEVt-1 | + | 0.012 | 0.044 |  |  | 0.009 | 0.378 |  |  | 0.006 | 0.218 |  |  |
| D\_PLUSRHLEVt-1 | + |  |  | 0.019 | 0.021 |  |  | 0.058 | 0.053 |  |  | 0.026 | 0.003 |
| D\_PLUSRLLEVt-1 | + |  |  | 0.021 | 0.007 |  |  | 0.000 | 0.497 |  |  | 0.018 | 0.023 |
| D\_MINUSRHLEVt-1 | + |  |  | 0.018 | 0.020 |  |  | 0.082 | 0.009 |  |  | 0.019 | 0.018 |
| D\_MINUSRLLEVt-1 | + |  |  | 0.002 | 0.423 |  |  | 0.014 | 0.344 |  |  | -0.007 | 0.221 |
| D\_A t-1 |  | 0.026 | 0.063 | 0.023 | 0.114 | 0.085 | 0.090 | 0.088 | 0.084 | 0.006 | 0.724 | 0.000 | 0.977 |
| D\_BBBt-1 |  | 0.009 | 0.531 | 0.004 | 0.803 | 0.087 | 0.093 | 0.091 | 0.085 | -0.029 | 0.073 | -0.036 | 0.028 |
| D\_BBt-1 |  | -0.012 | 0.461 | -0.018 | 0.288 | 0.009 | 0.870 | 0.013 | 0.819 | -0.037 | 0.043 | -0.045 | 0.017 |
| D\_Bt-1 |  | -0.031 | 0.082 | -0.039 | 0.040 | -0.022 | 0.730 | -0.011 | 0.875 | -0.055 | 0.007 | -0.067 | 0.002 |
| D\_CCCt-1 |  | -0.042 | 0.172 | -0.049 | 0.114 | -0.031 | 0.766 | -0.019 | 0.860 | -0.061 | 0.067 | -0.073 | 0.031 |
| BM t |  | 0.003 | 0.136 | 0.003 | 0.139 | 0.003 | 0.440 | 0.003 | 0.435 | 0.003 | 0.270 | 0.002 | 0.284 |
| LNSALESt |  | 0.015 | <.0001 | 0.014 | <.0001 | 0.003 | 0.772 | 0.005 | 0.695 | 0.016 | <.0001 | 0.014 | <.0001 |
| DEISSt+1 |  | -0.002 | 0.792 | -0.001 | 0.819 | 0.001 | 0.984 | 0.000 | 0.994 | -0.003 | 0.618 | -0.003 | 0.652 |
| NOAt-1 |  | 0.030 | <.0001 | 0.030 | <.0001 | 0.006 | 0.282 | 0.006 | 0.293 | 0.027 | <.0001 | 0.027 | <.0001 |
| Control for firm clustering | | Yes |  | Yes |  | Yes |  | Yes |  | Yes |  | Yes |  |
| Industry effects |  | Yes |  | Yes |  | Yes |  | Yes |  | Yes |  | Yes |  |
| Year effects |  | Yes |  | Yes |  | Yes |  | Yes |  | Yes |  | Yes |  |
| **Panel B: p-values for tests of coefficient differences** | | | | | | | | | |  |  |  |  |
| D\_CHGHLEVt-1 > D\_CHGLLEVt-1 | | | 0.190 |  |  |  | 0.023 |  |  |  | 0.016 |  |  |
| D\_PLUSRHLEVt-1 > D\_PLUSRLLEVt-1 | | | |  | 0.401 |  |  |  | 0.079 |  |  |  | 0.201 |
| D\_MINUSRHLEVt-1 > D\_MINUSRLLEVt-1 | | | |  | 0.051 |  |  |  | 0.079 |  |  |  | 0.006 |
| N | | 9373 |  | 9373 |  | 8542 |  | 8542 |  | 9437 |  | 9437 |  |
| Likelihood Ratio | |  |  |  |  | 506. 96 |  | 507.96 |  |  |  |  |  |
| R2 | | 46% |  | 46% |  |  |  |  |  | 39% |  | 39% |  |

Note: All *p* values are based on the two-tailed tests except those on variables with predicted signs. For these variables, p values are based on one-tailed tests.

D\_CHGHLEVt-1 = 1 for firms with D\_CHGt-1 at 1 and a leverage ratio above the median leverage for all firms with D\_CHGt-1 at 1, and 0 otherwise. Leverage ratio is defined at long-term debt divided by lagged total assets [data9 / data6]. D\_CHGLLEVt-1 = 1 for firms with D\_CHGt-1 at 1 and a leverage ratio below or at the median leverage for all firms with D\_CHGt-1 at 1, and 0 otherwise. D\_PLUSRHLEVt-1 and D\_PLUSRLLEVt-1 ( D\_MINUSRHLEVt-1 and D\_MINUSRLLEVt-1) are defined analogously among firms with a plus (minus) notch. All other variables are as defined in tables 1 and 2.

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| **Table 4: The Relation between Credit Rating Changes in the Subsequent Year and Smoothness Changes in Current Year** | | | | | | | | | | | |
| Smoothing Measure: |  | ΔSMOOTHACT1t | | | | ΔSMOOTHACT2t | | ΔSMOOTHACT3t | | | |
| Variable | Pred. | Model (7) | | Model (8) | | Model (8) | | Model (7) | | Model (8) | |
| sign | Coeff | *p* | Coeff | *p* | Coeff | *p* | Coeff | *p* | Coeff | *P* |
|  | | | |  |  |  |  |  |  |  |  |
| INTERCEPT |  | 1.315 | <.0001 | 0.148 | 0.665 | 1.031 | <.0001 | 1.301 | <.0001 | 0.072 | <.0001 |
| ΔSMOOTHt | + | 0.288 | 0.000 |  |  |  |  | 0.249 | 0.002 |  |  |
| D\_POSt\*ΔSMOOTHt | - | -0.445 | <.0001 |  |  |  |  | -0.378 | 0.001 |  |  |
| ΔSMOOTHXEMt | + |  |  | 1.234 | 0.000 |  |  |  |  | 1.334 | 0.000 |
| D\_POSt\*ΔSMOOTHXEMt | - |  |  | -1.536 | 0.000 |  |  |  |  | -1.624 | 0.002 |
| ΔSMOOTHACTt | + |  |  | 1.384 | <.0001 | 0.166 | 0.031 |  |  | 1.383 | 0.000 |
| D\_POSt\*ΔSMOOTHACTt | - |  |  | -1.720 | <.0001 | -0.205 | 0.046 |  |  | -1.716 | 0.001 |
| D\_POSt |  | 0.595 | <.0001 | 1.999 | <.0001 | 0.489 | <.0001 | 0.562 | <.0001 | 2.041 | <.0001 |
| ΔLEVt |  | -1.084 | <.0001 | -1.084 | <.0001 | -1.243 | <.0001 | -1.175 | <.0001 | -1.183 | <.0001 |
| ΔSALESt |  | 0.286 | 0.000 | 0.285 | 0.000 | 0.219 | 0.027 | 0.238 | 0.004 | 0.239 | 0.004 |
| ΔFCFt |  | 0.387 | 0.094 | 0.355 | 0.124 | 0.023 | 0.937 | 0.291 | 0.239 | 0.279 | 0.239 |
| ΔPPEt |  | 0.105 | 0.232 | 0.099 | 0.260 | 0.207 | 0.072 | 0.211 | 0.024 | 0.211 | 0.024 |
| ΔSIZEt |  | 0.679 | <.0001 | 0.686 | <.0001 | 0.760 | <.0001 | 0.671 | <.0001 | 0.674 | <.0001 |
| ΔINT\_COVt |  | 0.000 | 0.603 | 0.000 | 0.602 | 0.000 | 0.474 | 0.000 | 0.689 | 0.000 | 0.689 |
| Year Effect |  | Yes |  | Yes |  | Yes |  | Yes |  | Yes |  |
| Industry Effect |  | Yes |  | Yes |  | Yes |  | Yes |  | Yes |  |
| N |  | 7006 |  | 7006 |  | 4738 |  | 6284 |  | 6284 |  |
| Likelihood Ratio |  | 392.10 |  | 397.24 |  | 258.58 |  | 338.35 |  | 340.39 |  |
|  | | | |  |  |  |  |  |  |  |  |

Note: All *p* values are based on two-tailed tests except those on variables with predicted signs. For these variables, *p* values are based on one-tailed tests. UPt+1 (DOWNt+1) = 1 if an issuer’s credit rating is upgraded (downgraded) in the subsequent year, and 0 otherwise. ∆SMOOTHt = the rank of change in earnings smoothness. Earnings smoothness is measured as [­s.d.(data123 for years t-4 to t)/s.d(data308 for years t-4 to t)]. ∆SMOOTHXEMt = the rank of change in earnings smoothness adjusted for discretionary smoothing activities. Earnings smoothness adjusted for discretionary smoothing activities is measured as [­s.d.((data123-abnormal accruals) for years t-4 to t) / s.d(data308 for years t-4 to t)], where abnormal accruals is defined the same as in table 1.

∆SMOOTHACTt = the rank of the extent of earnings smoothing , which is defined the same as in table 1.

**Table 5: Earnings Smoothing Activities Conditional on Three Earnings Thresholds**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Pred. | | Model (1) | | | | Model (2) | | | Model (1) | | | | Model (2) | | |
| **Variable** | Sign | | Coeff | | *p* | | Coeff | | *p* | Coeff | *p* | | | Coeff | | *P* |
| **Panel A** | |  | **Subsample with EPS decrease** | | | | | | | **Subsample with EPS increase** | | | | | | |
| D\_CHGt-1 | | + | 0.018 | 0.012 | |  | |  | | 0.011 | | 0.060 |  | |  | |
| DPLUSRt-1 | | + |  |  | | 0.022 | | 0.012 | |  | |  | 0.018 | | 0.021 | |
| DMINUSRt-1 | | + |  |  | | 0.015 | | 0.051 | |  | |  | 0.005 | | 0.279 | |
| N | |  | 4026 |  | | 4026 | |  | | 5126 | |  | 5126 | |  | |
| R2 | |  | 46% |  | | 46% | |  | | 47% | |  | 47% | |  | |
| **Panel B** | |  | **Subsample with negative EPS** | | | | | | | **Subsample with positive EPS** | | | | | | |
| D\_CHGt-1 | | + | 0.016 | 0.084 | |  | |  | | 0.013 | | 0.028 |  | |  | |
| DPLUSRt-1 | | + |  |  | | 0.010 | | 0.225 | |  | |  | 0.019 | | 0.008 | |
| DMINUSRt-1 | | + |  |  | | 0.021 | | 0.062 | |  | |  | 0.006 | | 0.203 | |
| N | |  | 2004 |  | | 2004 | |  | | 7369 | |  | 7369 | |  | |
| R2 | |  | 51% |  | | 51% | |  | | 46% | |  | 46% | |  | |
| **Panel C** | |  | **Subsample that misses analyst forecast** | | | | | | | **Subsample that meets/beats analyst forecast** | | | | | | |
| D\_CHGt-1 | | + | 0.003 | 0.393 | |  | |  | | 0.021 | | 0.004 |  | |  | |
| DPLUSRt-1 | | + |  |  | | 0.017 | | 0.082 | |  | |  | 0.027 | | 0.002 | |
| DMINUSRt-1 | | + |  |  | | -0.012 | | 0.150 | |  | |  | 0.015 | | 0.052 | |
| N | |  | 2507 |  | | 2507 | |  | | 4891 | |  | 4891 | |  | |
| R2 | |  | 46% |  | | 46% | |  | | 45% | |  | 45% | |  | |

Note: Models (1) and (2) are estimated with SMOOTHACT1 as the dependent variable. For parsimony, only the variables of interest are included. D\_CHGt-1=1 if data280 equals to 4, 6, 7, 9, 10, 12, 13, 15, 16, 18, 19, or 21, and 0 otherwise. DPLUSRt-1 = 1 if data280 equals to 4, 7, 10, 13, 16 or 19, and 0 otherwise. DMINUSRt-1 = 1 if data280 equals to 6, 9, 12, 15, 18, or 21. SMOOTHACT1 is as defined in Table 1.

**Figure 1**: Extent of Smoothing by Firms with a Plus or Minus Notch Relative to Other Firms within the Same Broad Rating Category

Panel A: The mean extent of smoothing (SMOOTHACT1t)



Panel B: The median extent of smoothing (SMOOTHACT1t)



Note:

The extent of smoothing is proxied by the rank of SMOOTHACT1t. SMOOTHACT1t = [­s.d.(data123 for years t-4 to t)/s.d(data308 for years t-4 to t)] - [­s.d.((data123-abnormal accruals) for years t-4 to t)/s.d(data308 for years t-4 to t)] as defined in Table 1.

**Figure 2**: Standard Deviation of Earnings and Cash Flows of Firms with a Plus or Minus Notch Relative to Those of Other Firms within the Same Broad Rating

Panel A: Mean standard deviation of earnings scaled by total assets



Panel B: Mean standard deviation of cash flows scaled by total assets



Note:

The standard deviation of earnings is measured over years t-4 to t, earnings is deflated with total assets. This term is the numerator of SMOOTHACT1t. The standard deviation of cash flows is measured over the same period and deflated the same way. It is the denominator of SMOOTHACT1t as defined in Table 1. **Appendix: Credit Rating Revisions across Broad Rating Categories and Those within a Broad Rating Category: the Difference of Stock Market Reactions**

This appendix investigates whether the stock market responds more strongly to rating revisions across two adjacent broad ratings (hereafter, ACROSS revisions) than to those within the same broad rating category (hereafter, WITHIN revisions). Evidence of stronger market reactions to ACROSS revisions would provide support for our conjecture that firms near changes to adjacent broad rating categories have greater incentives to improve or maintain their ratings.

Bond rating change announcements are collected from FISD. FISD contains bond rating history from credit rating agencies since April 1995. The initial sample consists of all bond rating changes of U.S. domestic taxable corporate bonds announced by S&P and Moody’s between April 1995 and December 2006. Since subsidiary and subordinated debt of the same firm have the same rating changes as senior debt, we exclude them. In addition, the following bonds are removed: Yankee bonds, issues denominated in a foreign currency, bonds issued through private placement, and convertible bonds. We also make the following adjustments to rating changes. When there are multiple rating changes to bond issues of the same issuer on the same date, we retain only the issue for which the rating change is the largest, since this issue appears to affect the stock price the most (Jorion et al. 2005). For two consecutive rating changes within three days for the same firm, we delete the second change. Following Jorion et al. (2005), we delete rating changes related to ‘M&A activities’ and ‘market conditions’ from the sample since these events could contaminate the information content of rating news. Bond rating revisions associated with default or bankruptcy filings are also deleted as they may cause extreme stock market reactions (Goh and Ederington 1999). We require stock return data from CRSP to compute abnormal stock returns around bond rating change announcements. The final sample for downgrades (upgrades) has 2,311 (1,070) observations.

To compare the stock market reactions to ACROSS revisions with those to WITHIN revisions, we employ the following regressions.

CAR = *α0 + α1*D\_ACROSS + *α2*CHA\_RATING + *α3*I/SGRADE +

*α4*RANK\_BROAD + *α5*LOG (DAYS) + ε (A1)

CAR = *α0 + α1*D\_ACROSS + *α2*CHA\_RATING + *α3*I/SGRADE + *α4*D\_AA +

*α5*D\_A + *α6*D\_BBB + *α7*D\_BB + *α8*D\_B + *α9*D\_CCC + *α10*D\_CC +

*α11*LOG (DAYS) + ε (A2)

Where,

CAR = cumulative abnormal returns, computed over the event window (-1, 1), where day 0 is the rating change announcement date. We define abnormal return as the daily stock return for a firm minus the daily value-weighted NYSE/AMEX market index return on the same day. To control for the effect of extreme values of CAR, we winsorize observations that are in the top and bottom 1 percent of its distribution.

D\_ACROSS = 1 for ACROSS revisions, and 0 otherwise. For example, if a rating is downgraded from AA to AA- by S&P, D\_ACROSS is set to 0. If a rating is downgraded from AA- to A+ by S&P, D\_ACROSS is set to 1.

CHA\_RATING = the absolute magnitude of the rating change (i.e., cardinal value of new rating – cardinal value of old rating). The cardinal values range from 1 (for the best rating) to 23 (for the poorest rating).

I/SGRADE =1 if a bond rating is downgraded (upgraded) from an investment (a non-investment) grade to a non-investment (investment) grade, and 0 otherwise. An investment grade is defined as at or better than a BBB rating assigned by S&P or a Baa rating assigned by Moody’s. Prior literature provides evidence that downgrades from investment to non-investment grade generate more negative stock returns than those within the investment grade or non-investment grade. I/SGRADE controls for this effect.

D\_AA, D\_A…….… and D\_C are dummy variables indicating each broad rating category. For example, D\_AA equals 1 if prior bond ratings are AA+, AA, AA- (S&P) or Aa1, Aa2, and Aa3 (Moody’s). Jorion and Zhang (2007) show that rating levels prior to ratings changes significantly affect stock market reactions to rating changes.

LOG (DAYS) is the natural log of the number of days since the previous rating change in the same direction. In other words, ‘DAYS’ is computed as days between two consecutive rating changes in the same direction (i.e., downgrade after downgrade or upgrade after upgrade). Following Jorion et al. (2005), if two consecutive rating changes are not in the same direction, we set ‘DAYS’ equal to ‘1200’. We do not have a predicted sign on LOG (DAYS). If LOG (DAYS) is large, each rating change is more likely to provide new information to the stock market. On the other hand, the larger distance can attenuate informational effects of a rating change due to various confounding events between two bond ratings (Jorion et al. 2005).

RANK\_BROAD is a cardinal measure of prior bond ratings. For instance, a prior bond rating of AAA (C) is assigned ‘1’ (‘9’).

A negative (positive) coefficient on D\_ACROSS in models (A1) and (A2) for downgrades (upgrades) supports stronger market reaction to ACROSS revisions than to WITHIN revisions. Table A1 presents the results for upgrades and downgrades separately. The coefficient on D\_ACROSS is negative (positive) for downgrades (upgrades) in both models, indicating that ACROSS revisions lead to stronger stock market reactions than WITHIN revisions.[[28]](#footnote-29) Prior literature on stock market response to credit rating revision announcements documents a weakly significant or insignificant market response to rating upgrades (e.g. Ederington and Goh 1998). Consistent with the literature, results in table A1 are much weaker for upgrades than for downgrades, both in terms of the R-squared and significance of the coefficients on the explanatory variables. In sum, our results support a stronger stock market reaction to rating revisions across broad rating categories than to those within a broad rating category.[[29]](#footnote-30)

**Table A1: The Stock Market Reaction to Bond Downgrades and Upgrades Across Broad Rating Categories and Within a Broad Rating Category**

Dependent Variable: CAR

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | DOWNGRADES | | | | |  | UPGRADES | | | | |
|  |  | Model (A1) | |  | Model (A2) | |  | Model (A1) | |  | Model (A2) | |
|  | Pred. Sign | Coeff | p |  | Coeff | p | Pred. Sign | Coeff | p |  | Coeff | p |
| INTERCEPT |  | 0.0691 | <.0001 |  | 0.0165 | 0.6517 |  | 0.0027 | 0.7275 |  | -0.0672 | 0.1080 |
| D\_ACROSS | - | -0.0140 | 0.0044 |  | -0.0135 | 0.0112 | + | 0.0039 | 0.1053 |  | 0.0045 | 0.0840 |
| CHA\_RATING |  | -0.0098 | 0.0002 |  | -0.0105 | <.0001 |  | -0.0010 | 0.5699 |  | -0.0004 | 0.8129 |
| I/SGRADE |  | -0.0032 | 0.6794 |  | -0.0002 | 0.9819 |  | -0.0043 | 0.2929 |  | -0.0068 | 0.2132 |
| RANK\_BROAD |  | -0.0171 | <.0001 |  |  |  |  | 0.0009 | 0.4281 |  |  |  |
| D\_AA |  |  |  |  | 0.0025 | 0.9453 |  |  |  |  | 0.0630 | 0.1366 |
| D\_A |  |  |  |  | 0.0020 | 0.9546 |  |  |  |  | 0.0732 | 0.0747 |
| D\_BBB |  |  |  |  | -0.0180 | 0.6159 |  |  |  |  | 0.0705 | 0.0852 |
| D\_BB |  |  |  |  | -0.0188 | 0.5977 |  |  |  |  | 0.0748 | 0.0690 |
| D\_B |  |  |  |  | -0.0447 | 0.2087 |  |  |  |  | 0.0737 | 0.0718 |
| D\_CCC |  |  |  |  | -0.0893 | 0.0141 |  |  |  |  | 0.0766 | 0.0618 |
| D\_CC |  |  |  |  | -0.2054 | 0.0002 |  |  |  |  | 0.0546 | 0.2136 |
| LOG(DAYS) |  | -0.0002 | 0.8921 |  | -0.0001 | 0.9166 |  | -0.0002 | 0.7776 |  | -0.0002 | 0.8539 |
| Adj. R2 |  | 5.7% |  |  | 6.5% |  |  | 0.0% |  |  | 0.0% |  |
| N |  | 2,311 |  |  | 2,311 |  |  | 1,070 |  |  | 1,070 |  |

Note:

All p values are based on two-tailed t-tests except those for variables with predicted signs.

1. Various incentives are examined in the literature. For example, managers smooth earnings to improve predictability of future earnings (Barnea et al. 1975; Tucker and Zarowin 2006), to improve long-term stock price (Goel and Thakor 2003), to reduce perceived bankruptcy risk (Trueman and Titman 1988), to reduce the probability of being fired (Fudenberg and Tirole 1995), and to protect managers’ private control benefits (Leuz et al. 2003). [↑](#footnote-ref-2)
2. However, in the recent mortgage market turmoil, the superior expertise of rating agencies has been questioned. See, for example, “Failing grades? Why regulators fear credit rating agencies may be out of their depth,” *Financial Times*, 17 May 2007. [↑](#footnote-ref-3)
3. See the October 8, 2002 Report of the Staff to the Senate Committee on Governmental Affairs, Financial Oversight of Enron: the SEC and Private-Sector Watchdogs, page 113. Also see “Rating agencies hit by subprime probe,” *Financial Times*, 16 August 2007. [↑](#footnote-ref-4)
4. Throughout the paper, we interchangeably use the phrases: being near a rating change, being near a downgrade or upgrade to another broad rating category, and being in the top or bottom of a broad category. [↑](#footnote-ref-5)
5. In unreported analyses we find that firms with stronger incentives to maintain or improve credit ratings are not more likely to report earnings that surpass earnings thresholds or have a higher magnitude of signed discretionary accruals. This is consistent with Graham et al. (2005) in that managers appear less interested in meeting or beating earnings benchmarks to improve credit ratings. If issuers manage accruals either upward or downward to smooth earnings, however, the absolute value of discretionary accruals should be larger for firms with stronger incentives. Our results in section 5.1 support this. [↑](#footnote-ref-6)
6. The definition we use follows S&P’s. Moody’s defines credit risk as a relative expected loss rate, which is the product of expected default rates and expected loss-severity rates in the case of default. [↑](#footnote-ref-7)
7. Moody’s also uses an alphabetic system, but augments the letter ratings with numbers instead of +/-. [↑](#footnote-ref-8)
8. Regulators’ focus on broad ratings is also described in a rating scoring system to compute capital requirements for investments made by insurance companies (Kisgen 2006). Investments in firms rated A- or above are assigned a value of 1. Investment in firms with a rating in the broad category of BBB, BB, B, C, and D are assigned a value of 2,3,4,5, and 6, respectively. Thus defined, a rating scoring system ignores notch ratings and focuses on only broad ratings. [↑](#footnote-ref-9)
9. For example, Shah (2007) compares the mean yield difference between ratings having a “+” notch and two adjacent rating groups. The first group has a “-” notch rating and is in a different broad rating category and the second group has a middle notch and is within the same broad rating category. The difference in yield is 47.7 basis point and 20.5 basis points for the first and the second group, respectively. Thus, the change in yield is 129 percent higher for a movement across broad rating categories than within a single broad rating category. Comparison of ratings having a “-” notch with two neighboring rating groups yields similar conclusion. [↑](#footnote-ref-10)
10. To date, no consensus exists as to whether earnings smoothing reduces the cost of equity. On one hand, smoother earnings enhance earnings predictability to outsiders and reduce information risk (or estimation risk), resulting in lower cost of equity (Francis et al. 2005). On the other hand, earnings smoothing can increase cost of equity by reducing the quality of earnings because earnings smoothing is considered as a device for opportunistic earnings management (Bhattacharya et al. 2003; Leuz et al. 2003; Myers et al. 2007). Motivated by these opposing views on the relation between earnings smoothing and cost of equity, a recent study, McInnis (2008) documents no effect of earnings smoothing on cost of equity by relying on standard asset pricing tests, suggesting that managers’ preference on smooth earnings paths is not driven by equity market. [↑](#footnote-ref-11)
11. See testimony of Sean J. Egan, Managing Director, Egan-Jones Ratings Co. before the Senate Committee on Banking, Housing, and Urban Affairs: The Role of Credit Rating Agencies in the Capital Markets (February 8, 2005). Also see “Report on the role and function of credit rating agencies in the operation of the securities markets,” The Securities and Exchange Commission, January 2003. [↑](#footnote-ref-12)
12. This reputational concern may be even more important to rating agencies that are NRSRO’s (Nationally Recognized Statistical Rating Organizations). These firms were designated by the SEC prior to the Credit Rating Agency Reform Act of 2006, which supports greater competition and transparency in the credit rating industry. The following five firms received NSRO designation: Moody’s, Standard & Poor’s, Fitch Ratings, A.M. Best, and Dominion Bond Rating Service. [↑](#footnote-ref-13)
13. Corporate ratings criteria, pp. 32 from “Rating Methodology: Evaluating the Issuer” published by Standard and Poor’s. [↑](#footnote-ref-14)
14. Since earnings changes influence earnings smoothness and rating agencies consider both earnings performance and volatility in the rating process, rating agencies likely consider the interaction between these two factors. We do not predict the impact of the interaction on the rating decision, although our research design in section 3 considers this interaction effect. [↑](#footnote-ref-15)
15. We require at least 3 years of data to be included in the sample. [↑](#footnote-ref-16)
16. SMOOTHt for the results presented in the paper is calculated based on earnings before extraordinary and discontinued items. Since rating agencies are likely to adjust special items reported by firms, we also calculate SMOOTHt after adjusting for special items reported in COMPUSTAT. The results hold to this adjustment. [↑](#footnote-ref-17)
17. Note that due to the way SMOOTHACT2t is measured, empirically, we cannot measure earnings smoothness adjusted for smoothing activity. Thus, there is no corresponding measure of SMOOTHXEM2t. In section 3.3 on the tests of H3, when SMOOTHACT2t is employed, model (7) is not tested and ∆SMOOTHXEMt is omitted from model (8). [↑](#footnote-ref-18)
18. All continuous variables are winsorized at 1/99 percent. Winsorization at 2/98 percent does not change the results. [↑](#footnote-ref-19)
19. Since not all industries classified based on the two-digit SIC codes experience rating changes in our sample period, we use the one-digit SIC code instead. [↑](#footnote-ref-20)
20. As 1988 is the first year when all firms have statement of cash flow data, and at least three consecutive years are required in measuring earnings smoothing activities, our sample period starts in 1990. [↑](#footnote-ref-21)
21. In Section 5, we further investigate whether differences in earnings smoothing behavior exist between investment and speculative grade categories based on multivariate analysis and provide potential explanations for why earnings smoothing behavior may be different between two groups. [↑](#footnote-ref-22)
22. Results of testing H2, presented in Table 3, suggest that the lack of statistical significance in the coefficient on DMINUSR is driven by firms with lower reliance on debt financing. [↑](#footnote-ref-23)
23. In the estimation of models (7) and (8), we only include rating changes of one notch. This mitigates concern that multiple-notch changes are likely caused by significant changes in the firm’s operating environment or other factors that do not relate to earnings. In addition, using only one-notch changes demonstrates how firms’ smoothing activity affects the probability of being upgraded or downgraded to the adjacent broad rating category. We also use logistic regressions that separately investigate the likelihood of upgrades and downgrades. Confirming results in table 4, improvement in earnings smoothness decreases the likelihood of rating downgrades and increases the likelihood of rating upgrades. [↑](#footnote-ref-24)
24. The differential impact of change in earnings smoothness when earnings increase versus when earnings decrease suggests stronger incentives for management to smooth earnings in the latter scenario. In Section 5.2, we further examine whether the extent of earnings smoothing differs in these two situations. [↑](#footnote-ref-25)
25. Hribar and Nichols (2007) document that the absolute amount of discretionary accruals is correlated with the volatility of cash flows. Following them, we include the volatility of assets-scaled cash flows from operating activity in models when |DA|t is the dependent variables. Results are robust to the inclusion of this additional control variable. [↑](#footnote-ref-26)
26. Results in table 5 are based on SMOOTHACT1 as the dependent variable. Main implications are similar with the other two measures of earnings smoothing activities. [↑](#footnote-ref-27)
27. This result is based on all bond issues of 217,483 from FISD database. More detailed descriptive statistics can be provided upon request. We also provide details about the FISD database in the appendix. [↑](#footnote-ref-28)
28. We also compare the cumulative abnormal returns (CAR) between rating changes across broad rating categories and rating changes within a broad rating category to show the economic significance of our results. For downgrades, CAR for rating changes across broad rating categories is much lower than CAR for rating changes within a broad rating category (-4.8% vs. -2.3%). For upgrade, CAR for the former group is higher than CAR for the latter group (0.63% vs. 0.4%). [↑](#footnote-ref-29)
29. As a sensitivity test, we also run models (A1) and (A2) without CHA\_RATING and only for one-notch bond rating changes (i.e., when CHA\_RATING =1). The results are qualitatively similar for downgrades while the coefficient on D\_ACROSS is not significant for upgrades. The results are also robust to CAR measurement based on the market model. [↑](#footnote-ref-30)