Hill, P., Korczak, A., & Wang, S. (2018). The use of earnings and operations management to avoid credit rating downgrades. *Accounting and Business Research*. https://doi.org/10.1080/00014788.2018.1479630

# The Use of Earnings and Operations Management to Avoid Credit Rating Downgrades[1]

Paula Hill
The School of Economics, Finance and Management
University of Bristol
8 Woodland Road
Bristol BS8 1TN
United Kingdom
paula.hill@bristol.ac.uk

Adriana Korczak[2]
The School of Economics, Finance and Management
University of Bristol
8 Woodland Road
Bristol BS8 1TN
United Kingdom
adriana.korczak@bristol.ac.uk
+44 (0)117 39 41490

Shuo Wang
Faculty of Economics and Business
University of Groningen
Nettelbosje 2
9747 AE Groningen
The Netherlands
shuo.wang@rug.nl

[1] We would like to thank Paul Brockman, Mark Clatworthy, Luzi Hail, Marcin Kacperczyk, Simi Kedia, Darren Kisgen, Sandy Klasa, Edward Lee, Dong Lou, Patricia C. O'Brien, Per Olsson (the editor), and seminar participants at Alliance Manchester Business School, the University of Nottingham and the University of Bristol for their helpful comments and suggestions. All remaining errors are our own.
[2] *Corresponding author*

**The Use of Earnings and Operations Management to Avoid Credit Rating Downgrades**


## Abstract

Firms placed on negative credit watch face the threat of a credit rating downgrade. At the same time, they are given the opportunity to put recovery efforts in place to retain their current credit rating. In this paper, we test to what extent firms use earnings management as a short-term recovery strategy. We find that both accruals-based and real earnings management are associated with firms avoiding credit rating downgrades, and that these alternative earnings management strategies tend to be complements rather than substitutes. However, following the passage of the Sarbanes Oxley Act, only real earnings management is significantly associated with the credit watch outcome. We find evidence that firms which maintain their rating via earnings management are better able to afford the inevitable earnings reversals, and that in the year following the credit watch period the credit rating performance of these firms is significantly better than firms which undergo a downgrade, with fewer downgrades and more upgrades in this period. Our results also imply that credit rating agencies are not misled by earnings management but rather allow for some discretion in reporting earnings that facilitates the dissemination of private information about future firm performance.



*JEL classification:* C25, G24, M41

*Keywords:* Accruals-based earnings management, real earnings management, credit ratings, firm recovery, credit watch.

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## 1. Introduction

We examine the extent to which firms under immediate threat of a credit rating downgrade employ earnings management to demonstrate their recovery to the credit rating agencies (CRAs). The immediate threat of a rating downgrade occurs when the rating agencies announce a *credit watch* review period with negative implications. Credit ratings impact the cost of borrowing (Hand et al. 1992, Augustin et al. 2014) and are linked to investment regulations and thus institutional investors' decisions about their investments (Kisgen 2006, White 2013, Alissa et al. 2013), and as such firms have strong incentives to maintain their credit rating.

The *credit watch* period is a short acute period of financial fragility instigated by a third party which requires corporate managers to undertake immediate recovery efforts. The motivation for our analysis is to employ this unique setting to examine the influence of CRA monitoring on managerial behaviour. Managers are under external and highly visible pressure to act quickly to demonstrate recovery or recovery potential. Studies by Alissa et al. (2013) and Jung et al. (2013) suggest that firms manage earnings as part of their strategy for managing their credit rating, however these studies focus on endogenous firm incentives to manage earnings, rather than on the influence of rating agency monitoring.

Firms are placed under negative *credit watch* when the CRA reviews a firm's creditworthiness with a view to downgrading its current credit rating. At the same time, firms are given the opportunity to employ recovery strategies to convince the CRA that they are worthy of the existing credit rating (Boot et al. 2006). Recovery strategies of firms have been examined in relation to firms in financial distress (see, inter alia, Sudarsanam and Lai 2001), however many firms placed on a negative credit watch face short-term negative pressures in relation to their performance which may fall far short of financial distress, and the recovery strategies firms

employ in the short term have received limited attention. Earnings management offers a firm a means of improving performance in the very short term and the prior literature suggests that firms employ both accruals-based and real earnings management to achieve short-term improvements to reported financials (inter alia, Roychowdhury 2006, Cohen et al. 2008).[1]

The theoretical underpinnings of this paper stem from the model developed by Boot et al. (2006), in which they show that firms put on a negative credit watch by CRAs have incentives to undertake recovery efforts to maintain their credit ratings. If the recovery efforts undertaken are successful the credit watch ends with a confirmation of the credit rating, whereas if the recovery efforts are inadequate the credit watch ends with a downgrade. We hypothesise that earnings management improves the likelihood that a firm will recover via a credit rating confirmation. Findings in support of our first hypothesis might suggest that the rating agencies are "fooled" by earnings management. However, in line with the arguments of DeFond and Park (1997), we conjecture that it is firms which are better able to withstand any earnings management reversals which are inclined to engage in earnings management, and that earnings management reversals notwithstanding, any earnings management during the credit watch period is not therefore associated with a worse performance, in terms of both accounting and credit rating, in the post-credit watch period.

The findings of this paper suggest that earnings management strategies designed to improve short-term performance, but which may have a deleterious impact on longer-term performance, have an impact on a firm's ability to recover and thereby retain its current credit rating. In turn, this is likely to impact a firm's real cost of capital and the investment decisions of institutional investors. We find that the probability of firm recovery at the end of the credit watch period is a function of both accruals-based and real earnings management during the credit

[1] There is a growing body of literature suggesting that firms use both real and accruals-based earnings management to achieve certain corporate goals. For example, Cohen and Zarowin (2010) and Kothari et al. (2016) confirm that firms engage in both real and accruals earnings management around seasoned equity offerings.

watch period. We find that real and accruals-based earnings management tend to be complements rather than substitutes and we suggest that conditional on the decision to engage in earnings management, the reasons for employing *both* real and accruals-based earnings management may be due to the lack of forewarning of the need to take immediate action to avoid the negative consequences of a rating downgrade. However, we find that the passage of the Sarbanes Oxley Act (SOX) on August 29, 2002 led to a shift in the CRAs' treatment of earnings management strategies, with only real earnings management being significantly associated with the credit watch outcome post SOX. We argue that this is in line with Dimitrov et al. (2015), who show that an increase in regulatory scrutiny causes the CRAs to become more conservative.

Commensurate with earnings management reversals, we find that the *accounting* performance of confirmed firms deteriorates in the first year after the conclusion of the credit watch period, whereas the accounting performance of downgraded firms remains the same. However, despite the earnings management reversals the accounting performance of firms with confirmed ratings is not less than that of downgraded firms one year after the end of the credit watch, suggesting that confirmed firms can better afford the earnings reversal. The *credit rating* performance of confirmed firms is significantly better than downgraded firms in the year following the credit watch, with fewer downgrades and more upgrades in this period. This suggests that where firms can afford the inevitable earnings reversal it benefits them to engage in earnings management to maintain their rating, since the rating is likely to be maintained in the longer term as well. DeFond and Park (1997) argue that where firms predict a reversal in their performance decline they are able and willing to "borrow" earnings from the future. We conjecture that CRAs treat the earnings management undertaken by firms which have their rating confirmed as a means of facilitating the dissemination of private information about the future performance of the firm.

In our analysis, we take account of the current debate in the literature about the validity of measures of accruals-based earnings management given the impact of changes in the operating environment on accruals, which is especially important in studies such as ours, which relate to the impact of exogenous events on earnings management. Our paper considers not just the instigation of the credit watch, but also its removal, and it is the existence of these two break points which enables us to be more confident that we identify discretionary earnings management associated with the credit watch. Nonetheless, we also undertake a supporting analysis in which we directly account for the fact that our measure of discretionary accruals might in part reflect firm idiosyncratic shocks, as suggested by Owens et al. (2017). We find that incorporating idiosyncratic shocks into our measure of discretionary accruals does not alter our results and further corroborates the association between income increasing earnings management and the likelihood of a credit rating confirmation.

We undertake a number of other supplementary sensitivity tests including examining the impact of the length of the credit watch period. The length of the credit watch period does not materially affect the employment of earnings management as a recovery strategy and we argue that firms are motivated to engage in earnings management even where the credit watch turns out to be short.[2]

Our results contribute to the prior literature by showing that monitoring by the rating agencies induces firms to engage in earnings management as a recovery tool, and we demonstrate the important role of real earnings management in avoiding a credit rating downgrade once a firm is placed on a credit watch with negative implications, which is over and above the impact of accruals-based earnings management. We also show that both real and accruals-based

[2] Ex ante a firm does not know how long the credit watch period will last and thus would be incentivised to start earnings management on announcement of the credit watch (earnings management would on average be unlikely to completely reverse in the very short term such that both earnings management and its reversal occur within one quarterly period). Further, while quarterly is the greatest frequency with which data are available to us, firms are not restricted to quarterly intervals in passing information to the rating agencies. Quarterly figures will reflect ex post what has happened on a more frequent basis during the credit watch period.

earnings management are employed in a complementary manner when the need to take action is both urgent and comes without forewarning.

A contemporaneous paper by Liu et al. (2017) provides independent evidence that firms which engage in earnings management successfully defend their credit rating at the conclusion of the credit watch review process. Their analysis focuses solely on accruals-based earnings management and we consider the additional importance of real earnings management and the interaction between accruals-based and real earnings management, which includes an analysis of the impact of SOX on the choice of earnings management strategy. We also add to the findings of Liu et al. by examining credit rating agency actions up to one year after the end of the credit watch period.[3] Caton et al. (2011) argue that where earnings management is employed to fool rating agencies this will inevitably result in more downgrades for firms which manage earnings once earnings management reverses. Liu et al. conclude that the deterioration in the accounting performance which follows higher levels of earnings management suggests that such earnings management is opportunistic, with the rating agencies either unwilling or unable to commit resources to discover earnings management.[4,5] By contrast, we argue that the fact that the rating agencies are not forced to reverse (i.e. downgrade) their positive response to earnings management (i.e. a rating confirmation) in the longer term suggests that earnings management provides the rating agencies with useful information. This suggestion is in line with recent evidence by Kraft (2015) which implies that the CRAs are sophisticated users of financial reporting information, as well as DeFond and Park (1997) who suggest that firms which expect

[3] Our paper consists of 1,229 Standard & Poor's credit watches from 1989 to 2011, whereas the sample in Liu et al. (2017) consists of 458 Moody's credit watches from 1992 to 2006. We also extend their analysis in a number of supplementary tests (see Section 7 for details). Inter alia, we employ the accruals-based earnings management model of Owens et al. (2017) to account for possible business model shocks as a driver of abnormal accruals, and we analyse the impact of the length of the credit watch period and contemporaneous Moody's credit watches.

[4] An alternative explanation suggested by Liu et al. (2017) is that earnings management is condoned by the rating agencies for agency or contractual reasons.

[5] In untabulated analysis we replicated the results of Liu et al. (2017) based on credit watches in a common sample period (1992-2006). Our findings do not change when we restrict the sample to this period and confirmed firms still undergo a better future rating performance.

poor current earnings to be followed by better future earnings elect to "borrow" earnings from the future.

Alissa et al. (2013) argue that companies use income increasing (decreasing) earnings management to achieve a target credit rating when their true credit rating is below (above) their target rating, but unlike our study the decision to engage in earnings management is endogenously determined under the assumption that a firm employs the model of Alissa et al. (2013) to determine under- or over-valuation of the rating. We assume that the decision to engage in earnings management is exogenously triggered by a credit watch action of a rating agency which indicates a potential over-valuation of the current rating and motivates a firm to take immediate action. Jung et al. (2013) also examine the link between accounting earnings and credit ratings and employ the assumption that firms near rating band boundaries engage in income smoothing in an attempt to gain upgrades or avoid downgrades. They only find support for the use of income smoothing to gain upgrades and suggest that this results from greater scrutiny of firms near to the downgrade boundary and/or earnings smoothing being an unimportant criterion for downgrades (but not upgrades). By contrast, we find that firms successfully engage in earnings management to avoid credit rating downgrades.

The rest of the paper is organised as follows; in Section 2 we describe the rating process and hypotheses development. Section 3 focuses on sample selection and data collection processes. We present our empirical results in Sections 4 through 7, and Section 8 concludes the paper.

## 2. Institutional Setting and Hypotheses

We commence this section by providing details of the credit ratings process to establish that accounting earnings are important inputs into the ratings process. This is a prerequisite for earnings management to be a potential determinant of credit rating outcomes. We then discuss

earnings management within the context of credit watch periods, from which we develop our hypotheses.

Since we employ a sample of Standard and Poor's credit watches, we examine the corporate ratings criteria published by Standard and Poor's in 2008 and 2013, with this latter document undergoing a revision in 2017. For each rated entity, Standard and Poor's establish both a business risk profile and a financial risk profile which feed into a credit rating "anchor" which is then subject to various modifiers. The business risk profile essentially captures the risks and rewards associated with the environment in which the firm operates (including country and industry risks). The financial risk profile is associated with the risks derived from a firm level analysis, including an assessment of the firm's management. Whilst a framework exists for the assessment of each rated entity, the financial and business risk profiles rely on both quantitative and qualitative assessments.

Kraft (2015) argues that accounting numbers are important inputs into the rating process and Standard and Poor's underline this by stating in their 2008 document "A company's financial reports are the starting point for the financial analysis of a rated entity (or issue)." Begley (2015) identifies Debt/EBITDA as Standard and Poor's key ratio for the purpose of the financial analysis (see also Standard and Poor's (2013a)[6]), and thus reported earnings are the basis for the denominator of this core ratio. The prior literature establishes that reported earnings are a primary accounting number for the purpose of credit ratings by showing that firms attempt to manipulate reported earnings to influence their credit rating. Alissa et al. (2013) argue that companies use income increasing (decreasing) earnings management to achieve a target credit rating when their true credit rating is below (above) their target rating. Jung et al. (2013) find evidence to suggest

[6] In fact, Standard and Poor's (2013a) establish two "core ratios", Funds from Operations (FFO) to Debt and Debt to EBITDA; however, S&P derive FFO from adjustments to EBITDA. Standard and Poor's (2013b) details the calculation of these core ratios. Specifically, "Our definition of FFO is EBITDA minus net interest expense minus current tax expense, after adjusting each of the three components according to our criteria". For the sake of clarity, we confirm that the three components referred to by S&P are EBITDA, interest expense and current tax expense.

that firms engage in income smoothing to gain rating upgrades. Begley (2015) demonstrates that firms attempt to manipulate EBITDA (to affect the value of their Debt/EBITDA ratio) to influence their credit rating, even where the cost of doing so is to engage in behaviour which might destroy firm value in the longer term.

Having established that accounting earnings are an important input into the ratings process, it is important that we consider rating agencies' adjustments to reported earnings. Any adjustment to reported earnings by the rating agencies is likely to mitigate the incentive to manage earnings. Alissa et al. (2013) argue that CRAs take financial statements at face value, suggesting either no or limited adjustments are made to the reported accounting numbers. Kraft (2015) argues, however, that accounting numbers do not enter the ratings process in their "raw" form. She investigates the precise nature of the adjustments made by Moody's ratings agency to reported financials. She provides evidence that the primary adjustments reflect increases in debt obligations to reflect off-balance sheet financing with the effect that leverage ratios significantly increase from those based on GAAP reported figures. However, Kraft finds that changes to reported earnings are minimal.[7] We suggest that the size of the adjustment to reported earnings means that the reduction in incentive to manage earnings is small. This is again borne out by the prior literature cited above, which confirms that firms manage their earnings to influence their credit rating.

The credit rating of a firm is placed on credit watch when short-term events indicate that a change in the rating may be due. Boot et al. (2006) argue that where a firm is under review for a rating downgrade, the firm has the opportunity to put in a recovery effort. At the end of the credit watch period the rating agency either amends (upgrade/downgrade) or confirms the current rating (rating confirmation); typically, the direction of any rating change follows the direction of

[7] Thus, the ratio of total debt to total assets increases on average by 70% with a median change of 20%, whereas adjustments to reported profits result in changes to the median return on assets (operating margin) of "only" (page 652) -2% (+3.4%).

the indicated review process, i.e. downgrades (upgrades) follow negative (positive) credit watch periods. The most likely outcome of a negative credit watch period is a rating downgrade; however, a significant minority of ratings are confirmed (38% in this study). Negative credit watch periods are more common and are the focus of our analysis.[8]

The credit watch period is typically short; the median duration across our sample is 78 trading days and this provides a unique and clearly defined setting in which to investigate managerial behaviour. Firms are under external and highly visible pressure to act quickly to demonstrate recovery or recovery potential. Both accruals and real earnings management offer firms a means of improving performance in the short term. Accruals-based earnings management has been employed by firms, inter alia, to mislead users of financial reports (Fields et al. 2001), to increase government support (Jones 1991), to inflate earnings before seasoned bond offerings (Caton et al. 2011) and, as reported above, to achieve target credit ratings (Alissa et al. 2013). The aim of accruals-based earnings management in the face of a downgrade threat would be to manage earnings upwards via changes in the discretionary portion of accruals. Discretionary accruals are the portion of accruals which are not explained by the economic circumstances of the firm (Jones 1991). Larger net discretionary accrued income results in higher earnings.

Roychowdhury (2006) finds evidence of the management of operational activities (real earnings management) for achieving short-term improvements in reported results, with firms engaging in price discounting, overproduction and a reduction in discretionary expenditures. Roychowdury (2006) argues that each of these strategies is associated with expected changes to financial reports; for example, abnormally high production costs relative to sales are suggestive of cash discounts to boost sales, abnormally low cash flows would be expected where firms offer better credit terms to boost sales and abnormally high production costs (in manufacturing firms)

[8] Hand, Holthausen and Leftwich (1992) report that only 15% of the bonds in their sample were under review for an upgrade, with 85% under review for a downgrade.

would be expected where these firms produce more goods than necessary to meet expected demand with the aim of reducing the cost of goods sold by spreading fixed costs across more units.

To summarise to this point, we argue that earnings management is commonly employed by firms to improve their reported accounting performance, that accounting earnings are important inputs into the ratings process, that rating agencies' adjustments to reported earnings are small and that earnings management can be successfully employed to influence credit rating outcomes. We argue that firms put on credit watch with negative implications have an incentive to manage their earnings in an attempt to protect their credit rating from a downgrade. The above arguments lead to our first hypothesis:

*H1: Earnings management improves the likelihood that a firm will avoid a rating downgrade at the end of a credit watch review period with negative implications.*

Earnings management is often associated with lower quality earnings (inter alia, Ali and Zhang 2015) and CRAs have strong incentives to protect their reputation (inter alia, Dimitrov et al. 2015) by discounting any attempt to fool them. An alternative hypothesis is that the CRAs appropriately adjust for any detected earnings management such that credit watch outcomes are not related to earnings management. To enable CRAs to discount earnings management we rely on the assumption that CRAs are sophisticated users of financial statements (e.g. Kraft 2015) and during the credit watch process are in a position to demand information from the firm's managers (Boot et al. 2006).

Nevertheless, even sophisticated users can make errors in analysing financial statements and unravelling earnings management is costly. Liu et al. (2017) argue that even following

Regulation Fair Disclosure,[9] the CRAs lack full access to internal records which may be required to identify earnings management. Findings in support of our first hypothesis might suggest that the rating agencies make errors. In this case, as argued by Caton et al. (2011), we expect that when the CRAs become aware of their error (as earnings management reverses), the rating agencies will be forced to downgrade the ratings of firms which were confirmed at the end of the credit watch period.

It is also possible that CRAs allow for managerial discretion to encourage the dissemination of private information. DeFond and Park (1997) suggest that firms which expect poor current earnings to be followed by better future earnings elect to "borrow" earnings from the future. We formulate our second hypothesis in line with the arguments of DeFond and Park (1997) and we conjecture that it is firms which are better able to withstand any earnings management reversals which are inclined to engage in earnings management. As such, earnings management reversals notwithstanding, any earnings management during the credit watch period is not associated with a worse performance, in terms of both accounting and credit rating, in the post credit watch period. Our second hypothesis is:

*H2: Firms which engage in earnings management during the credit watch review period are those which can afford to do so, and they do not have a worse accounting and credit rating performance in the post credit watch review period.*

Our two hypotheses require us to discount the possibility that earnings management is itself a by-product of future profitability, which is then reflected in better credit rating outcomes, an issue we discuss further at the end of Section 3.3 and Section 4.1.

[9] Implemented on 23rd October 2000.

## 3. Data

### *3.1.Sample*

We focus on negative credit watches issued by Standard and Poor's to firms listed on the NYSE, AMEX or NASDAQ for the period 1989 through 2011. We exclude financial firms (SIC codes 6000 through 6999) since firm recovery variables are unlikely to be comparable with other sectors. Where a firm's rating is placed on negative credit watch owing to a merger or acquisition (M&A) the recovery effort may be affected by other factors related to the merger/acquisition. For this reason, we exclude all credit watch announcements related to mergers and acquisitions.

After exclusion of financial firms and M&A related credit watch announcements we have a sample of 2,076 negative credit watch events. From this universe of credit watch events, earnings management data are available for 1,229 events, which form the sample for our paper. Of the 1,229 credit watches 471 (38%) end in a confirmation of the previous rating and 758 (62%) end in a downgrade. In Table 1 we present basic descriptive statistics for our credit watch sample and show that the sample we employ does not differ materially from the universe of credit watch announcements.

**Insert Table 1 about here**

Credit watch periods vary in length across our sample; 10% are of one-month duration (21 trading days) or less and 10% are greater than 12 months duration. We support our analysis across the full sample with an analysis on longer and shorter credit watch periods separately.

We examine each event in our sample from the last quarterly accounts prior to the start of the credit watch period to the first quarterly accounts after the end of the credit watch period. This period of analysis fully captures any changes during the entire length of the credit watch period. We repeat all our analyses using data from the last quarterly accounts prior to the start of the credit watch period to the *last* quarterly accounts *before* the end of the credit watch period and find that our conclusions do not differ. These results are available from the authors on

request. Changes for each quarter are calculated with respect to the same quarter of the previous year. The accruals-based earnings management and real earnings management variables represent the average quarterly figure for the credit watch period, measured on an arithmetic basis.

### *3.2. Accruals-based Earnings Management*

Firms might increase their earnings by increasing the amount of net discretionary accrued income. To calculate abnormal discretionary accruals, we compare the discretionary accruals of our sample firms with the discretionary accruals which would be predicted employing data for similar firms in the same time period.

We employ the model of Jones (1991) modified for the impact of performance (return on assets (ROA)) and the use of quarterly data (Kothari et al. 2005, Louis et al. 2008). We divide all firms in the Compustat database into portfolios for each quarter based on 2-digit SIC industry codes. We run the following regression on total accruals for each quarter and each 2-digit SIC industry portfolio:

$$TA_{jt} = \alpha + \beta_1 Q1_{jt} + \beta_2 Q2_{jt} + \beta_3 Q3_{jt} + \beta_4 \Delta SALES_{jt} + \beta_5 PPEGT_{jt} + \varepsilon_{jt} \quad (1)$$

Where, *TA* is total accruals for firm *j* for each quarter *t*, the change in noncash current assets less the change in current liabilities plus the change in debt in current liabilities minus depreciation ($\Delta$ Compustat 40 - $\Delta$ Compustat 36 - $\Delta$ Compustat 49 + $\Delta$ Compustat 45 – Compustat 5). *ΔSALES* is the change in sales from *the same quarter in the previous year* to the current quarter. *PPEGT* is the gross property, plant and equipment (Compustat 118). *Q1* to *Q3* are the dummy variables indicating the fiscal quarter. As is standard practice, all variables, including the constant, are

scaled by total assets (Compustat 44) to reduce heteroscedasticity. Following Louis et al. (2008), the minimum number of observations for each industry-quarter is 20.

The regression coefficients are then employed to determine the portion of accruals in the credit watch period, which is discretionary. For each quarter, the level of discretionary accruals is given by:

$$DISC\_ACC_{jt} = TA_{jt} - (\hat{\alpha} + \widehat{\beta 1} Q1_{jt} + \widehat{\beta 2} Q2_{jt} + \widehat{\beta 3} Q3_{jt} + \widehat{\beta 4} \Delta SALES_{jt} + \widehat{\beta 5} PPEGT_{jt}) \quad (2)$$

The regression coefficients for the appropriate industry and quarter are used to calculate discretionary accruals in the credit watch window for each sample firm for each quarter in the credit watch period. To allow for the impact of performance on discretionary accruals we follow Louis et al. (2008) and we now divide all the firms in the Compustat database into portfolios based on ROA quintiles in addition to 2-digit SIC industry codes and quarter. We then calculate the level of discretionary accruals for each industry/ROA portfolio for each quarter again employing the regression coefficients for the appropriate industry and quarter. The performance adjusted abnormal accrual, *Adj_ABACC*, equals the discretionary accruals of the firm minus the average discretionary accrual of the industry/ROA/quarter matched portfolio.

There is a debate in the literature about the suitability of the measures of accruals-based earnings management currently employed, however no consensus has been reached about a suitable alternative (see, for example, Ball 2013, Owens et al. 2017). Further, some of the novel approaches suggested are largely untested and may exacerbate measurement errors for some firms in ways which are neither readily apparent nor understood. Our primary results are based on up-to-date versions of conventional models that are widely used in the most recent studies published (inter alia, Ali and Zheng 2015, Bratten et al. 2016, Louis and Sun 2016, Kothari et al. 2016, Vansant 2016). Owens et al. (2017) argue that the performance adjusted measure of

abnormal accruals of Kothari et al. (2005) does not go far enough to address the problem of the impact of performance on the measurement of discretionary accruals and in Section 6.1 we repeat our analyses following the approach of Owens et al. (2017), which allows for the impact of idiosyncratic shocks on the accruals generating process. We provide further discussion of the impact of performance on measured earnings management at the end of Section 3.3 on real earnings management.

Debt/EBITDA is a core ratio used by S&P to assess the financial profile of each issuer (Begley 2015) and since this ratio is impacted by current rather than total accruals, we repeat our analyses employing current accruals in place of total accruals. The results do not differ materially from those employing total accruals and full details are available from the authors upon request.

### *3.3. Real Earnings Management*

Firms might improve their reported performance in the near term by real earnings management (real activities manipulation) defined by Roychowdhury (2006) as "departures from normal operating practices" (page 337). Following Roychowdhury (2006), we employ abnormal cashflows, production expenses and discretionary expenses as measures of real earnings management. Following on from our arguments in Section 2, firms which engage in real earnings management would be associated with abnormally high levels of production costs relative to sales (the result of sales boosted by cash discounts and/or, in the case of manufacturing firms, overproduction[10]), abnormally low cash flows relative to sales (sales boosted via favourable credit terms) and abnormally low levels of discretionary expenses (earnings boosted by a reduction in expenses). Favourable credit terms and a reduction in discretionary expenses have opposing effects on cashflows and thus where a firm offers favourable credit terms *and* reduces expenses, we may not see abnormally low levels of cashflows.

[10] For further details, see also Section 7, where we specifically consider overproduction by manufacturing firms.

To calculate abnormal real earnings management, we compare our sample firms with similar firms in the same time period. We divide all firms in the Compustat database into portfolios for each quarter based on 2-digit SIC industry codes. To calculate abnormal cash flows, production costs and discretionary expenses, we first estimate normal figures for each industry (2-digit SIC) in each quarter:

$$CFO_{jt} = \alpha_1 + \alpha_2 + \beta_1 Q1 + \beta_2 Q2 + \beta_3 Q3 + \beta_4 SALES_{jt} + \beta_5 \Delta SALES_{jt} + \varepsilon_{jt} \quad (3)$$

$$PROD_{jt} = \alpha_1 + \alpha_2 + \beta_1 Q1 + \beta_2 Q2 + \beta_3 Q3 + \beta_4 SALES_{jt} + \beta_5 \Delta SALES_{jt} + \beta_6 \Delta SALES_{jt-4} + \varepsilon_{jt} \quad (4)$$

$$EXP_{jt} = \alpha_1 + \alpha_2 + \beta_1 Q1 + \beta_2 Q2 + \beta_3 Q3 + \beta_4 SALES_{jt} + \varepsilon_{jt} \quad (5)$$

*CFO* is the operating cash flow (Compustat 108[11]) for firm *j* at the end of the quarter *t*; *PROD* is the quarterly production costs, given by the cost of goods sold (Compustat 30) plus the change in inventory (Compustat 38). *EXP* is the quarterly discretionary expenses, the sum of selling, general and administrative expenses (Compustat 1), and research and development expenses (Compustat 4).[12] *SALES* is sales (Compustat 2) in quarter *t*. *ΔSALES* is the difference between sales in the current quarter *t* and sales in the same quarter of the previous year. The first constant term, $\alpha_1$, is an unscaled intercept used by Roychowdhury to ensure the mean abnormal figure for every industry-year is zero. All other variables are scaled by total assets (Compustat 44) to reduce heteroscedasticity and thus the second intercept $\alpha_2$ is the inverse of total assets. *Q1* to *Q3* are the dummy variables indicating the fiscal quarter, and scaled by total assets. Again, the minimum number of observations for each industry-quarter is 20.

[11] The operating cash flow is a year-to-date item and for quarters two through four we calculate the quarterly operating cash flow by subtracting operating cash flow in the previous quarter.

[12] This variable is only available where research and development expenses are available in the Compustat database. We do not set missing values to zero.

The estimated intercepts and coefficients from the portfolio estimations are employed to calculate the abnormal cash flow, production costs and discretionary expenses for each firm as follows:

$$ABCFO_{jt} = CFO_{jt} - (\widehat{\alpha_1} + \widehat{\alpha_2} + \widehat{\beta 1} Q1_{jt} + \widehat{\beta 2} Q2_{jt} + \widehat{\beta 3} Q3_{jt} + \widehat{\beta 4} SALES_{jt} + \widehat{\beta 5}\ \Delta SALES_{jt}) \quad (6)$$

$$ABPROD_{jt} = PROD_{jt} - (\widehat{\alpha_1} + \widehat{\alpha_2} + \widehat{\beta 1} Q1_{jt} + \widehat{\beta 2} Q2_{jt} + \widehat{\beta 3} Q3_{jt} + \widehat{\beta 4} SALES_{jt} + + \widehat{\beta 4} SALES_{jt} + \widehat{\beta 5}\ \Delta SALES_{jt} + \widehat{\beta 6}\ \Delta SALES_{jt-4}) \quad (7)$$

$$ABEXP_{jt} = EXP_{jt} - (\widehat{\alpha_1} + \widehat{\alpha_2} + \widehat{\beta 1} Q1_{jt} + \widehat{\beta 2} Q2_{jt} + \widehat{\beta 3} Q3_{jt} + \widehat{\beta 4} SALES_{jt}) \quad (8)$$

Alissa et al. (2013) allow for the impact of performance on real earnings management and, as with the method set out in Section 3.2, we divide all firms in the Compustat database into portfolios based on ROA quintiles in addition to 2-digit SIC industry codes and quarter. We then calculate the level of real earnings management for each industry/ROA portfolio for each quarter employing the regression coefficients for the appropriate industry and quarter. The performance adjusted real earnings management variables, *Adj_ABCFO, Adj_ABPROD, Adj_ABEXP*, equal the real earnings management of the firm minus the average real earnings management of the industry/ROA/quarter matched portfolio.

We also construct a comprehensive measure of real earnings management, *Adj_REM1*, as suggested by Cohen et al. (2008). *Adj_REM1* equals minus one times *Adj_ABCFO* plus *Adj_ABPROD*. This measure shows how firms use both abnormal cash flow and abnormal production costs to manage reported performance. As argued above, favourable credit terms and a reduction in discretionary expenses have opposing effects on cashflows and we therefore employ a second comprehensive measure of real earnings management which excludes cashflows, *Adj_REM2,* calculated as *Adj_ABPROD* less *Adj_ABEXP*.

The measures of real earnings management are also subject to criticism – a deterioration in credit quality (as indicated by a credit watch with negative implications) might cause changes in firm strategies and/or performance which are reflected in measured (real or accruals-based) discretionary earnings management but which do not in fact result solely from managerial discretion. In part, this is mitigated by the fact that we show that earnings management is associated with the credit watch period and not the periods before and after the credit watch. However, since the turning point may be caused by a change in performance as a firm first deteriorates and then recovers we acknowledge that our results are predicated on the extent to which our empirical proxies truly capture discretionary earnings management, and are thus at best a joint test of both the adequacy of the proxies we employ and our hypotheses.

### *3.4. Firm Characteristics Associated with Recovery*

We employ control variables to represent the likelihood of recovery owing to firm characteristics. Table 1 suggests that the probability of recovery is related to the initial credit quality. The approximate chance of recovery is 12% for firms with an AAA rating, 34% for firms with a BBB rating and about 50% for firms with a B rating or below. Prima facie, it is surprising that the chance of recovery declines with increasing credit quality; for example, it might be expected that firms at the investment rating threshold (BBB rating) would have the highest incentive to put in a recovery effort. Boot et al. (2006) argue that the likelihood of a firm being put on credit watch is a function of the firm's credit quality and those of low credit quality would usually be downgraded directly and thus only those firms with a higher than average chance of recovery for that rating category are put on credit watch. Chung et al. (2012) also report that a negative credit watch is less likely to lead to a downgrade for firms with low credit quality and suggest that lower credit quality firms have a higher incentive to recover. The credit rating of the firm is thus a key recovery potential variable.

To assess the impact of firm strategies on the probability of recovery, we control for the firm characteristics which Boot et al. (2006) suggest determine the likelihood that a recovery effort will be successful. Less flexible firms will not be able to recover as readily and our first set of variables relates to the flexibility of the firm. Anderson et al. (2003) argue that sales, general and administrative (SGA) expenses are sticky, i.e. when sales decline, SGA expenses cannot be reduced at the same pace and thus firms with higher SGA in their cost structure are less likely to recover (expected sign is negative). Our second measure of flexibility is plant, property and equipment (PPE) as a proportion of total assets. Where total assets consist of a high proportion of fixed assets we assume that the firm is less flexible and thus less likely to recover quickly (expected sign is negative). Where firms have a high level of debt financing, with its implicit fixed cost in the form of promised interest payments, it is assumed to be less flexible. We employ the interest cover ratio (expected sign is positive), with the latter giving an indication of how comfortably the firm is able to meet its current interest payments from current profits.[13] Firm size (variable = *Size*) is positively correlated with credit ratings across our sample (the two have a positive correlation of 0.51); however, we hypothesise that large firms have access to greater resources to aid recovery (expected sign is positive). Boot et al. also suggest that recovery potential will depend on the type of activity in which the firm is involved and we employ sector dummy variables to capture variations in recovery potential across sectors. The chances of recovery are likely to be higher when other firms are also doing well and thus we control for general economic circumstances via the variable *Recession*. This is a dummy variable which takes a value of 1 if the month of credit watch announcement is defined as recession by the U.S. Federal Reserve (expected sign is negative).

[13] Financial gearing might also indicate financial flexibility but given its high correlation with both firm size and interest cover, we employ interest cover.

We also employ the length of the credit watch (*Length*) as a control variable. Bannier and Hirsch (2010) report that larger firms have shorter credit watch reviews, consistent with their ability to comply quickly with the rating agency demands. However, our regression results indicate that while larger firms are more likely to recover, the length of the credit watch has a (small) positive impact on recovery chances. Chung et al. (2012) report that CRAs, on average, take longer to assess recovery than to assess a downgrade.

Definitions of the variables employed in our models are in Table 2. All variables employ the latest data at the start of the credit watch period and accounting variables are winsorized at the 1% level.

**Insert Table 2 about here**

## 4. The Impact of Earnings Management on Recovery

### *4.1. Univariate Analysis*

In Table 3 we compare our key variables across firms which were downgraded at the end of the credit watch period and firms which had their rating confirmed and therefore made a successful recovery. In addition, we also show statistics for pre- and post-credit watch periods and test whether firms' earnings management practices are triggered by the credit watch. The lengths of the pre- and post-credit watch periods we examine are equal to the length of the credit watch period for each firm.

**Insert Table 3 about here**

Firms with a rating confirmation (successful recovery) have significantly positive mean and median abnormal net accrued discretionary earnings (average per period) during the credit watch, whereas downgraded firms do not; the mean and median values of abnormal net accrued discretionary earnings are significantly larger for firms with rating confirmations than for downgraded firms. We predicted via our first hypothesis that firms would signal their likelihood of recovery via managing their earnings upwards during the credit watch period and the data in

Table 3 suggest that firms which make a successful recovery indeed improve their accounting results during the credit watch period (relative to the periods before and after the credit watch period) via increases in net accrued discretionary earnings. Our findings employing current accruals in place of total accruals do not alter these conclusions.

Firms which attempt to improve their performance via real earnings management would be associated with abnormally high levels of production costs relative to sales as a result of sales boosted by cash discounts. Table 3 shows that firms with a rating confirmation (successful recovery) have significantly positive mean and median abnormal production costs (average per period) during the credit watch, whereas downgraded firms do not, and both mean and median values are significantly larger for firms with rating confirmations than for firms with rating downgrades. For confirmed firms (but not downgraded firms) the production costs are significantly higher during the credit watch period relative to the periods before and after the credit watch period.

Firms which attempt to improve their performance may also have abnormally low cash flows relative to sales as a result of sales being boosted via favourable credit terms. However, reducing discretionary expenses would increase cashflows. Thus, two earnings management strategies, i.e. favourable credit terms and a reduction in discretionary expenses, have opposing effects on cashflows. Data on discretionary expenses are only available for 453 out of 1,229 credit watches, and we have pre- and post-credit watch data for 302 of these 453. Based on this sub-sample we show that both confirmed (successful recovery) and downgraded firms have abnormally low levels of discretionary expenses during the credit watch period, however only downgraded firms have discretionary expenses which are significantly lower during the credit watch period than in the pre and post credit watch periods. Where discretionary expenses are abnormally low we expect cashflows to be abnormally high and we find that downgraded firms have significantly positive cashflows in the credit watch period, but not confirmed firms. This

suggests that confirmed firms may engage in *both* the reduction of discretionary expenses *and* improving credit terms to boost sales. We predicted via our first hypothesis that firms would also improve their likelihood of recovery by real earnings management to boost reported figures during credit watch periods and the data in Table 3 suggest that this is the case.

The composite real earnings management measures reflect the underlying inputs, and there is therefore little to add to the above discussions. *Adj_REM1* is dominated by abnormally high levels of production costs relative to sales for confirmed firms. However, the results for *Adj_REM2* suggest that for the sub-sample of firms with available expenses data, cost-cutting dominates price discounts and/or overproduction as a means of recovery.

Finally, we find that earnings management is specifically associated with the credit watch period, not before and not after. We conclude that the earnings management measures are not a by-product of future improvements in profitability, since earnings management does not continue into the post credit watch period for confirmed firms. In Section 5 we show that earnings management reverses in the post-credit watch period, which suggests that earnings management arises as a deliberate strategy during the credit watch period.

### *4.2. Regression Analysis*

We now test the impact of our earnings management variables on firm recovery in the presence of firm characteristics which would be likely to impact the chance of recovery. We employ logistic regression models where our dependent variable takes a value of 1 where a firm recovers at the end of the credit watch period (*Confirm* = 1) and a value of 0 where a firm is downgraded (*DG* = 0). "*FirmActions*" in Equation 9 below relates to our earnings management variables (*Adj_ABACC, Adj_ABCFO, Adj_ABPROD, Adj_EXP, Adj_REM1* and *2*).

$$Logit\ (=1\ Confirm;\ =0\ DG) = Constant + \beta_1\ Firm\ Actions + \beta_2\ RATING +$$
$$+ \beta_3\ LENGTH + \beta_4\ INTCOVER + \beta_5\ PPE + \beta_6\ SGA +$$

$$+ \beta_7 SIZE + \beta_8 RECESSION + \beta_n \text{ Sector Dummies} \quad (9)$$

The results of running Equation 9 across our sample firms are shown in Table 4. The results in Table 4 relate to the entire span of the credit watch period, from the last accounts prior to the start to the first accounts following the end.[14] Since some firms contribute more than one observation to our sample we control for clustering at the firm level.

**Insert Table 4 about here**

We find that the likelihood that a firm will recover is significantly related to higher levels of abnormal accrued earnings, lower levels of abnormal cashflows and higher levels of abnormal production expenses.[15] *Adj_REM1* is a composite measure of real activities management which takes account of the joint impact of abnormal cashflows and production expenses and an increase in this measure of abnormal real earnings increases the probability of recovery. These findings support *H1*, that firms' earnings management activities predict the likelihood of successful recovery.[16]

We do not find a relationship between the recovery probability and abnormal discretionary expenses, nor our alternative composite measure of real earnings management (*Adj_REM2*), which incorporates abnormal discretionary expenses. This is in line with the results in Table 3, where we report no statistical difference between abnormal expenses during the credit watch relative to the pre- and post-credit watch period for firms with a confirmed rating. We previously highlighted the opposing impact of discretionary accruals and favourable credit terms on abnormal cashflows; while lower than expected discretionary expenses do not impact the

[14] Results for firms examined from the last accounts before the start of the credit watch to the last accounts before the end of the credit watch confirm those in Table 4 and are available from the authors upon request.

[15] Employing current rather than total accruals does not change any of our conclusions. The results are available from the authors upon request.

[16] We do not infer the economic magnitude of the impact of earnings management since the magnitude of measured earnings management does not translate into a dollar amount being manipulated. We nonetheless present marginal effects in Table 4, which are roughly equal to the instantaneous change in probability of recovery associated with a one standard deviation increase from the sample mean in the variable of interest holding all dummy variables at zero and all other variables at their mean.

probability of recovery, as reported above, lower than expected cashflows (associated with improved credit terms) do increase the probability of recovery.

Given that *Adj_REM2* is dominated by the impact of expenses and the fact that expenses data are available for only a subset of our sample, we do not employ *Adj_REM2* in our supplementary analyses.

## 5. Are CRAs Misled by Inflated Accounting Earnings?

Our second hypothesis concerns the post credit watch performance of firms with a confirmed rating. The second hypothesis is related to the question of whether the rating agencies, which also play a monitoring role (Boot et al. 2006), are "fooled" by earnings management during the credit watch period or whether they treat the earnings management as a means of facilitating the dissemination of private information. Alissa et al. (2013) argue that rating agencies take financial statements at face value, since they do not see their role as auditors, and they show that earnings management strategies are successful in helping firms achieve their desired rating.[17] However, DeFond and Park (1997) suggest that firms which expect poor current earnings to be followed by better future earnings elect to "borrow" earnings from the future. Firms which do not expect an improvement in their current earnings do not borrow from future earnings in this way. In this scenario earnings management conveys information about future performance.

If CRAs are initially misled by earnings management, this would result in firms with confirmed ratings, which engage in higher levels of earnings management, having poorer longer-term performance once the earnings management undertaken in the credit watch period reverses.

[17] In related work, Bonsall et al. (2015) argue that the effectiveness of monitoring by CRAs deteriorates after initial rating issuance, since it is at the initial issue that the reputation effects are strongest. The fact that the rated firm pays for the rating also creates a disincentive for monitoring since the rating agency then has a vested interest in the survival of the firm (Manso (2013)). However, Manso (2013) goes on to argue that the potential for collusion is mitigated by the fact that the fee paid by any one firm is small relative to the potential impact of rating inaccuracies on the reputation capital of the CRA.

If CRAs see through the earnings management and treat it as a source of private information about future performance, confirmed firms which engage in higher levels of earnings management in the credit watch period would be associated with a better performance after the credit watch.

**Insert Table 5 about here**

We find that for confirmed firms, earnings reversals occur in the year after the credit watch period in line with earnings management during the credit watch period, and the *change* in return on assets is significantly more negative for confirmed firms than downgraded firms. However, despite earnings reversals we find that confirmed firms have a better accounting performance than downgraded firms. The earnings management and commensurate earnings reversals are clearly worthwhile from a credit rating point of view, since confirmed firms are significantly less likely to be downgraded and more likely to be upgraded than downgraded firms in the year following the conclusion of the credit watch period. Table 5 Panel B shows that 16.56% (6.37%) of confirmed companies versus 25.99% (4.49%) of downgraded firms are further downgraded (upgraded). The ratio of firms acquired, liquidated and withdrawn is also significantly smaller for confirmed than downgraded firms (2.76% versus 5.67%). These results support our second hypothesis, that it is firms which can afford to do so which engage in earnings management, and that earnings management during the credit watch period is associated with a better credit rating performance in the post credit watch period. This suggests that CRAs see through the earnings management and treat it as a source of private information about future performance.

## 6. The Interaction between Accruals-based and Real Earnings Management

### *6.1. The trade-off between accruals-based and real earnings management*

In this section, we consider whether there are any trade-offs between accruals-based and real earnings management. The interaction between accruals-based earnings management and real earnings management has been considered by Zang (2012) and Cohen and Zarowin (2010). Cohen and Zarowin examine earnings management around seasonal equity offerings and Zang in relation to earnings targets, and in both cases the decision to engage in earnings management is determined endogenously and hence pre-planned, with lead-in times of around three years in the case of Cohen and Zarowin and not less than one year in the case of Zang. In our setting the imposition of a credit watch acts as an exogenous incentive to manage earnings and firms will have limited, if any, warning of the credit watch.[18] As such there is limited, if any, opportunity to pre-plan earnings management. This difference in setting may have important implications for both the sequential order of earnings management and for substitution versus complementary effects.

We begin our analysis by examining the correlations between the different earnings management measures in Panel A of Table 6.

**Insert Panel A of Table 6 here.**

The correlation matrix suggests that accruals-based and real earnings management act as complements rather than substitutes, contrary to prior findings. We suggest that this may be due to the "surprise" element of credit watches, their short-term nature and the certainty of negative consequences in the event of a rating downgrade. Given the need to act immediately, where the

[18] We allow that the credit watch may be predictable in the period immediately prior to the credit watch and we can't rule out the possibility that in some cases CRAs warn managers that the firm will imminently be put on credit watch. For example, the model of Boot et al. (2006) suggests that a bad news signal will be received before any credit watch event, and Hand et al. (1992) argue that some credit watches may be predictable from relative bond yields (this is similar to employing a model of under or over valuation of the rating at the start of the credit watch, which we consider in Section 7). There is no evidence to suggest that the credit watch is predictable other than in the period immediately preceding its imposition, and this does not therefore impact our analysis.

decision to engage in earnings management is taken, firms might be inclined to employ both types of earnings management.[19]

In our setting, firms may also lack time to arrange the order of earnings management techniques. Cohen and Zarowin assume that firms first select their level of accruals-based earnings management and the level of real earnings management is selected in accordance with the pre-selected level of accruals-based earnings management. Zang assumes the reverse. Since neither of these settings is similar to ours we start with the assumption that accruals-based and real earnings management are jointly determined and we employ a two-stage least squares estimation. The structural equations are set out at 10 and 11 below, and are designed to test the choice of accruals-based and real earnings management as a function of the costs and opportunities associated with each type of earnings management. We make no a priori assumption about the choice of earnings management strategy associated with the length of the credit watch and this appears as a common control variable.

$$Adj\_ABACC = \beta_0 + [\text{Common Controls: } \beta_1 LENGTH + \beta_2 NOA + \beta_3 OPCYCLE + \beta_4 ROA + \beta_5 SIZE + \beta_6 BM] + [\text{Unique Exogenous: } \beta_7 LITIGATION + \beta_8 BIGN + \beta_9 TENURE] + \beta_{10} Adj\_REM1 + \text{Sector Dummy} + \text{Year Dummy} + \text{Error} \quad (10)$$

$$Adj\_REM1 = \beta_0 + [\text{Common Controls: } \beta_1 LENGTH + \beta_2 NOA + \beta_3 OPCYCLE + \beta_4 ROA + \beta_5 SIZE + \beta_6 BM] + [\text{Unique Exogenous: } \beta_7 MSHARE + \beta_8 Z + \beta_9 MTR] + \beta_{10} Adj\_ABACC + \text{Sector Dummy} + \text{Year Dummy} + \text{Error} \quad (11)$$

[19] We allow the possibility that the positive correlation may also reflect the fact that overproduction can lead to an increase in measured discretionary accruals (Cohen and Zarowin, 2010), albeit the absolute value of the correlation between abnormal production and discretionary accruals is lower than that for abnormal cashflows.

*Adj_ABACC* and *Adj_REM1* are the earnings management variables defined in Table 2. *LENGTH* is the log of the length of credit watch. The remaining earnings management variables are taken from Cohen and Zarowin (2010) and Zang (2012). *NOA* is net operating assets (Annual Compustat 144 + 9 + 34 - Annual Compustat 1) scaled by sales revenue (Annual Compustat 12); *NOA* is a determinant of accruals-based earnings management in Zang and real earnings management in Cohen and Zarowin, and is thus included as a common control. *OPCYCLE* is the operating cycle (days receivable plus days inventory less days payable at the end of the last year prior to the credit watch) and captures a firm's accounting flexibility. Accounting flexibility impacts the ability of the firm to engage in accruals-based earnings management and thus the preference for real earnings management. The decision to include *OPCYCLE* as a common control at this stage is empirical.[20] We also include return on assets (*ROA*), *SIZE* and book to market (*BM*).

The unique determinants of accruals-based earnings management are *LITIGATION* (dummy equal to 1 if the sample firm operates in industries with SIC codes 2833-2836, 3570-3577, 3600-3674, 7371-7379, 8731-8734), *BIGN* (dummy equal to 1 for big auditors[21]) and *TENURE* (length of audit tenure). Dechow et al. (1996) find that accruals-based earnings management is more likely to be detected and lead to legal action in industries with high litigation risk, while *TENURE* (see Cohen and Zarowin) and *BIGN* capture increased scrutiny and thus a

[20] A Hausman tests confirms that *OPCYCLE* is a weak instrument for accruals-based earnings management and, further, it leads to over-identification when combined with the other instruments for accruals-based earnings management. The results of our two-stage least squares analysis suggests that accruals-based earnings management may indeed follow real earnings management and we show that operating cycle is a key determinant of the decision to engage in real earnings management.

[21] In order to create a comprehensive measure of *Big Auditor* we track all changes among top auditing firms that overlap with our sample period. In 1989, Ernst & Whinney merged with Arthur Young to form Ernst & Young, and Deloitte Haskins & Sells merged with Touche Ross to form Deloitte Touche, which reduced the "Big 8" to the "Big 6": Arthur Andersen, Price Waterhouse, Coopers & Lybrand, Ernst & Young, KPMG Peat Marwick and Deloitte Touche. In 1998, Price Waterhouse merged with Coopers & Lybrand to form PricewaterhouseCoopers and thus the Big 6 were further reduced to the Big 5. In 2002, Arthur Andersen surrendered their auditing license, resulting in the Big 4. Our *Big Auditor* dummy is set to 1 if our sample firm was audited by the Big 6 before 1998, the Big 5 between 1998 and 2002, and the Big 4 after 2002.

reduced opportunity to engage in accruals-based earnings management. The unique determinants of real earnings management are *MSHARE* (firm sales divided by total industry sales at the close of the year prior to the credit watch), *Z* (Altman's *z*-score at the close of the year prior to the credit watch) and *MTR* (marginal tax rate[22]). Following Zang (2012), the cost of real earnings management is lower for market leaders and financially healthy firms (high *Z*), and higher for firms with a high marginal tax rate.

At Stage 1 we estimate the reduced form equations, substituting for the right-hand-side values of *Adj_ABACC* and *Adj_REM1* employing the variables derived from Equations 10 and 11 above, to arrive at fitted values of *Adj_ABACC* and *Adj_REM1*. At Stage 2 we replace the right-hand-side values of *Adj_ABACC* and *Adj_REM1* with their fitted values and estimate Equations 10 and 11 above. The results are set out in Columns 1 to 4, Panel B of Table 6.

**Insert Panel B of Table 6 about here.**

The coefficient of the fitted value of *Adj_ABACC* is significantly and *positively* associated with *Adj_REM1* and the Hausman test confirms that *Adj_ABACC* is endogenous. Again, this suggests that where the credit watch motivates earnings management, both accruals-based and real earnings management tend to be employed jointly.

The fitted value of *Adj_REM1* is not a significant determinant of *Adj_ABACC* and the Hausman test fails to reject the hypothesis that *Adj_REM1* is exogenous. Zang (2012) provides a similar finding and argues that this supports the assumption that accruals-based earnings management is determined after real earnings management. In light of this, we follow Zang (2012) by employing a sequential model in which we firstly model *Adj_REM1* as a function of the costs and opportunities associated with both accruals and real earnings management, i.e. all the independent variables set out in Equations 10 and 11, excluding *Adj_ABACC* and *Adj_REM1*.

[22] Available from https://faculty.fuqua.duke.edu/~jgraham/taxform.html.

We then model accruals-based earnings management as a function of these same variables plus the predicted and unexpected levels of real earnings management. The results are set out in Columns 5 and 6, Panel B of Table 6.

We find that both the predicted and unexpected level of real earnings management are significantly and positively related to the level of abnormal accruals-based earnings management. Again, we conclude that real and accruals-based earnings management are complements within our setting. The length of the credit watch period does not impact the choice of earnings management strategy. We find that the operating cycle and the financial health of the company (z-score) lead to substitution effects; the former relates to the opportunity to undertake accruals-based earnings management and the latter to the cost of real earnings management. Firms tend to use more real earnings management when their accounting flexibility is low, reflecting a decreased ability to undertake accruals-based earnings management, and when their financial health is high, reflecting a lower cost of real earnings management.

We confirm that the results in this section are robust to the employment of the revised measure of accruals-based earnings management that incorporates the impact of idiosyncratic risk in accordance with the model of Owens *et al.* (2017), as set out in Section 7.

### *6.2. The Impact of SOX on the use of Accruals-based and Real Earnings Management*

We consider that changes to the US financial reporting regulatory framework across time may impact the choice of recovery strategies employed by firms. Cohen et al. (2008) argue that firms tend to use real earnings management activities rather than accruals-based earnings management following the passage of the Sarbanes Oxley Act (SOX) on August 29, 2002. With the advent of SOX, Cohen et al. (2008) argue that "accrual manipulations were more likely to draw auditors' or regulators' scrutiny than real earnings management" (page 761). In our paper, the purpose of the earnings manipulation is credit rating maintenance, however firms would still

be concerned about any litigation consequences. We therefore allow that the passing of the Sarbanes Oxley Act may lead to a reduction in the use of accruals-based earnings management relative to real earnings management activities by firms seeking to convince the rating agencies of their recovery. To investigate we re-run Equation 9 separately across the 692 credit watches in the pre-SOX period and 537 credit watches in the post-SOX period.[23] We present our results in Table 7.

**Insert Table 7 about here**

In Table 7 we confirm that accruals-based earnings management predicts recovery in the pre-SOX period. It is not, however, a significant determinant of recovery post-SOX. Conversely, the real earnings management strategies represented by high levels of *Adj_ABPROD* and *Adj_REM1* become (more) significant in the post-SOX period, where *Adj_REM1* is the composite measure of real earnings management suggested by Cohen et al. (2008), which takes account of the joint impact of abnormal cashflows and production expenses.

To confirm that SOX precipitated a change in firm behaviour in respect of accruals-based earnings management, we compare the level of accruals-based earnings management for our sample firms in the pre- and post-SOX period (untabulated). This comparison fails to confirm that our sample firms reduced the level of accruals-based earnings management post-SOX. In turn, this implies that it is the rating agencies, rather than our sample firms, that switched strategy as a result of SOX; real earnings management becomes a relatively more important indicator of recovery after SOX, whereas accruals-based earnings management is relatively more important pre-SOX. Dimitrov et al. (2015) show that an increase in regulatory scrutiny causes the CRAs to become more conservative (and results in a loss of information to the market). Our finding

[23] In Section 7 we consider the impact of under- (below or at target rating) and over-valuation (above target rating) on recovery likelihood. The proportion of firms with credit ratings above target does not significantly differ across the pre- and post-SOX periods.

implies that the advent of increased scrutiny post-SOX increased CRA conservatism in relation to accruals-based earnings management.

## 7. Sensitivity Analyses

In this section, we outline other sensitivity tests we conduct to ensure that our results are robust. These results are available from the authors upon request.

In our sensitivity tests we examine how our results are affected when we consider the impact of performance on measured accruals earnings management, the impact of the length of the credit watch on earnings management, the impact of a firm's target credit rating on incentives to engage in earnings management, the ability of manufacturing firms to engage in overproduction, any confounding effects of contemporaneous credit watches instigated by Moody's and the potential impact of auditor reputation on earnings credibility. We dedicate a paragraph to each of these six additional tests.

We address the impact of performance on measured discretionary accruals via the method of Owens et al. (2017). They suggest that an improved measure of discretionary accruals can be achieved by also accounting for firm idiosyncratic risk in the model of Jones et al. (1991). The inclusion of idiosyncratic risk in our measure of discretionary accruals does not alter our conclusions. Employing this revised measure, we continue to find that for confirmed firms, discretionary accruals are increased during the credit watch period, but not before and not after. We find that the likelihood that a firm will recover is significantly related to higher levels of abnormal accrued earnings.

We consider the possibility that there is a greater incentive to manage earnings for longer credit watch periods where the downgrade happens after the quarterly figures are released. Firms with shorter credit watches might refrain from managing earnings if their efforts are unlikely to be seen until after the end of the credit watch period. Two counter arguments to the theory that

longer credit watches lead to more earnings management are as follows: First, ex ante a firm does not know how long the credit watch period will last and thus would be incentivised to start earnings management on announcement of the credit watch (earnings management would on average be unlikely to completely reverse in the very short term such that both earnings management and its reversal occur within one quarterly period). Second, while quarterly is the greatest frequency with which data are available to us, firms are not restricted to quarterly intervals in passing information to the rating agencies. Quarterly figures will reflect ex post what has happened on a more frequent basis during the credit watch period. We therefore examine separately short (< 3 months) and long (> 3 months) credit watch periods.[24] We conclude that the length of the credit watch period does not materially affect the employment of earnings management as a recovery strategy. Firms are motivated to engage in earnings management even where the credit watch turns out to be short, which we suggest is explained by the two counter arguments we present.

Roychowdhury (2006) investigates the use of real earnings management to avoid reporting losses and thus controls for incentives to avoid reporting losses. Similarly, we investigate the role of incentives for a firm to recover its rating. We employ the target rating model of Alissa *et al.* (2013) and we assume that firms have a greater incentive to avoid a downgrade if they are either below or at their target rating and a lesser incentive if they are already above their target rating. We find that being above target versus below or at target does not affect the impact earnings management and the distance from the target rating is therefore more likely to capture under- or over-valuation rather than incentives to recover. We find that this under- or over-valuation determines outcomes independently of earnings management; firms which are not over-valued, since their ratings are at or below target, are associated with an

[24] We select the period of three months to define "short" and "long" since this is the time period during which the rating agencies aim to complete any credit watch review (Hill and Faff, 2010).

increased probability of recovery. Most importantly, the earnings management variables remain significant in the presence of the target rating variable.

Firms which offer price discounts to boost sales would be expected to have abnormally high production costs relative to sales. In Table 4 we report that firms with abnormally high production costs are more likely to recover. However, manufacturing firms also have the opportunity to decrease their cost of goods sold via overproduction, where overproduction would also result in abnormally high production costs. The logic behind overproduction is that (assuming variable costs per unit are constant) fixed costs would then be spread over a larger number of units, resulting in a lower COGS and higher margins. Roychowdhury (2006) argues that given only manufacturing firms can engage in overproduction, the opportunity to boost reported short-term performance via high abnormal production costs is greater for manufacturing firms. We re-estimate Equation 9 across manufacturing and non-manufacturing firms separately and find that abnormal production costs are more strongly related to the probability of recovery in manufacturing firms than non-manufacturing firms.

Where a firm is placed on negative credit watch by Moody's before being placed on credit watch by Standard and Poor's, the Moody's credit watch might act as the trigger for earnings management. Moody's started providing credit watch information from 1992. 1,173 observations (95.4% of our sample) occur in the period from 1992 to 2011. Among these 1,173 observations, there are 390 observations where Standard and Poor's and Moody's credit watches overlap, and 44 observations where Moody's announced a credit watch prior to the Standard and Poor's credit watch announcement. We remove these 44 observations and re-estimate our main results. We confirm that results based on this modified sample are not materially affected.

We also consider the impact of auditor reputation on our results. Alissa et al. (2013) argue that the CRAs are not auditors and have no incentive to monitor the veracity of accounting numbers. However, it is possible that CRAs are more likely to accept reported figures when they

are supported by the reputation of a big auditor. We find that 95% of our sample firms were audited by "Big Auditors" and thus the sample composition suggests that auditor reputation will not materially affect our results.

## 8. Conclusions

In this paper, we test whether firms use earnings management as a short-term recovery strategy to avoid a credit rating downgrade. A firm faces a threat of a credit rating downgrade when it is put on a negative credit watch by the CRAs. A negative credit watch ends with either a confirmation of the current credit rating or a downgrade. The existing theoretical literature (Boot et al. 2006) suggests that while on credit watch firms have the chance to put in place recovery efforts to avoid a downgrade. We investigate short-term strategies targeted at increasing accounting earnings.

Based on a sample of negative credit watches issued by Standard & Poor's for US listed firms between 1989 and 2011 we find that strategies targeted at increasing accounting earnings are successfully employed by firms to avoid a credit rating downgrade and thereby make a successful recovery. Issuers use both accruals-based and real earnings management as recovery strategies. Real earnings management and accruals-based earnings management work as complements, which confirms the importance of analysing them both. However, while real earnings management continues to determine successful recovery post-SOX, accruals-based earnings management does not.

We find that firms with confirmed ratings, which engage in higher levels of earnings management, have better longer-term rating performance despite the fact that earnings management reverses. In line with the findings of DeFond and Park (1997), we suggest that earnings management is employed to avoid an imminent rating downgrade by firms that are able

to afford an earnings reversal. It would appear that the CRAs recognise earnings management and are guided rather than misled by its employment.

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## Table 1
## Credit Watch Frequencies for the Full and Matched Samples

| | Universe | | | Sample with Earnings Management Data | | |
|---|---|---|---|---|---|---|
| | N | Confirmed | Downgraded | N | Confirmed | Downgraded |
| All Negative Watches | 2,076 | 38% | 62% | 1,229 | 38% | 62% |
| **Panel A: Frequency of Credit Watch by Year** | | | | | | |
| 1989-1994 | 154 | 37% | 63% | 103 | 40% | 60% |
| 1995-2000 | 611 | 35% | 65% | 435 | 34% | 66% |
| 2001-2006 | 855 | 38% | 62% | 461 | 42% | 58% |
| 2007-2011 | 456 | 41% | 59% | 230 | 39% | 61% |
| **Panel B: Frequency of Credit Watch (CW) by CW Length in Months** | | | | | | |
| *LENGTH*< = 1 month | 253 | 32% | 68% | 124 | 31% | 69% |
| 1 month<*LENGTH*<3 months | 753 | 36% | 64% | 419 | 37% | 63% |
| 3 months<*LENGTH*<6 months | 573 | 39% | 61% | 334 | 37% | 63% |
| 6 months< *LENGTH*<12 | 336 | 41% | 59% | 234 | 43% | 57% |
| *LENGTH*>12 months | 161 | 42% | 58% | 118 | 46% | 54% |
| **Panel C: Frequency of Credit Watch by Credit Quality** | | | | | | |
| AAA | 10 | 10% | 90% | 8 | 12% | 88% |
| AA | 67 | 22% | 78% | 50 | 18% | 82% |
| A | 376 | 32% | 68% | 251 | 34% | 66% |
| BBB | 540 | 33% | 67% | 329 | 34% | 66% |
| BB | 574 | 38% | 62% | 336 | 40% | 60% |
| B | 431 | 49% | 51% | 218 | 52% | 48% |
| CCC and below | 78 | 41% | 59% | 37 | 49% | 51% |
| **Panel D: Frequency of Credit Watch by Fama French Sector** | | | | | | |
| Consumer Non-Durables | 205 | 31% | 69% | 133 | 24% | 76% |
| Consumer Durables | 95 | 27% | 73% | 50 | 30% | 70% |
| Manufacturing | 350 | 36% | 64% | 224 | 36% | 64% |
| Energy | 146 | 48% | 52% | 97 | 44% | 56% |
| Chemistry | 90 | 44% | 56% | 76 | 45% | 55% |
| Business Equipment | 174 | 43% | 57% | 124 | 40% | 60% |
| Telecoms | 207 | 36% | 64% | 125 | 37% | 63% |
| Utilities | 155 | 47% | 53% | 114 | 54% | 46% |
| Retail | 248 | 26% | 74% | 116 | 28% | 72% |
| Health | 90 | 50% | 50% | 53 | 53% | 47% |
| Other | 316 | 40% | 60% | 117 | 41% | 59% |

Table 1 presents credit watch statistics by (i) year (ii) length of credit watch (iii) credit quality and (iv) sector, for both the universe of 2,076 qualifying negative credit watches and our sample of 1,229 qualifying negative watches with earnings management data. The sample and universe statistics are very similar in all cases. We employ the sectors of the "12 Industry Portfolios" of Fama and French, from which we exclude the financial sector.

## Table 2
## Variable Descriptions

| Variable | Definition |
|---|---|
| | **Panel A. Measures of Earnings Management** |
| *Adj_ABACC* | Performance-adjusted abnormal accruals. To determine the portion of discretionary accruals in total accruals we employ the regression model of Jones (1991) (with quarterly dummies), which we estimate for each quarter and 2-digit SIC industry portfolio. The regression coefficients for the appropriate industry and quarter are used to calculate discretionary accruals in the credit watch window. To allow for the impact of performance on discretionary accruals we further divide firms into portfolios based on ROA quintiles (in addition to quarter and 2-digit SIC codes). The performance adjusted abnormal accrual, *Adj_ABACC*, for each sample firm equals the discretionary accruals of the firm *minus* the discretionary accruals of the industry/ROA/quarter matched portfolio. |
| *Adj_ABACC_IDIOSHOCK1* | We incorporate the idiosyncratic risk measure of Owens et al. (2017) into the regression model of Jones (1991), following which the measure follows that of *Adj_ABACC* set out above. |
| *Adj_ABACC_IDIOSHOCK2* | As an alternative to incorporating idiosyncratic risk into the Jones (1991) model, we adjust the performance-adjusted benchmark such that *Adj_ABACC_IDIOSHOCK2*, equals the discretionary accruals of the firm minus the average discretionary accruals of the industry/ROA/IDIOSHOCK/quarter matched portfolio. |
| *Adj_ABCFO* | Performance-adjusted abnormal cash flows. First we determine the relationship between cashflows and sales for each quarter and 2-digit SIC code via the regression model of Roychowdhury (2006) (with quarterly dummies). The regression coefficients for the appropriate industry and quarter are used to calculate abnormal cashflows in the credit watch window for each sample firm employing firm level data on quarter, cashflows and sales. To allow for the impact of performance on cashflows we further divide firms into portfolios based on ROA quintiles (in addition to quarter and 2-digit SIC industry codes). The performance-adjusted abnormal cashflow for each sample firm equals the abnormal cashflows of the firm *minus* the abnormal cashflows of the industry/ROA/quarter matched portfolio. |
| *Adj_ABPROD* | Performance-adjusted abnormal production costs. We follow the method described for *Adj_ABCFO* above. The performance-adjusted abnormal production cost for each sample firm equals the abnormal production costs of the firm *minus* the abnormal production costs of the industry/ROA/quarter matched portfolio. |
| *Adj_ABEXP* | Performance-adjusted abnormal discretionary expenses. We follow the method described for Adj_ABCFO above. The performance-adjusted abnormal discretionary expenses for each sample firm equals the abnormal discretionary expenses of the firm minus the abnormal discretionary expenses of the industry/ROA/quarter matched portfolio. This measure is available for 453 out of 1,229 credit watches. |
| *Adj_REM1* | We follow Cohen et al. (2010) to construct a comprehensive measure of real earnings management, where Adj_REM = (-1)* Adj_ABCFO + Adj_ABPROD. We do not include Adj_ABEXP as data on discretionary expenses are missing for a large number of our sample firms. |
| *Adj_REM2* | Adj_REM2 is an alternative comprehensive measure of real earnings management, given the potential for cash flows to be either increased (e.g. cutting expenses) or reduced (e.g. overproduction) as a result of real earnings management. Adj_REM2 = Adj_ABPROD - Adj_ABEXP. This measure is only available for 453 out of 1,229 credit watches and is therefore only employed in our main results. |

## Cont'd Table 2
## Variable Descriptions

| | |
|---|---|
| **Panel B. Variables Used to Calculate Earnings Management Measures** | |
| *TA* | Total accruals divided by total assets (Δ40 - Δ36 - Δ49 + Δ45 –5)/44 |
| *SALES* | Sales revenue divided by total assets (2/44) |
| *PPEGT* | Gross PPE divided by total assets (118/44) |
| *CFO* | Operating cash flows divided by total assets. We adjust the up-to-year variable to retrieve the quarterly operating cash flow (108/44) |
| *PROD* | Production costs divided by total assets (30 + Δ38)/44 |
| *EXP* | Discretionary expenses (selling, general and administrative expenses, and research and development expenses) divided by total assets. (1 + 4)/44 |
| **Panel C. Proxies for Firm Recovery** | |
| *RATING* | The cardinal values of S&P's credit rating. 21 = AAA, 20 = AA+, 1 = C. 12 = BBB- is the boundary between investment and speculative grades. |
| *INTCOVER* | Operating income before depreciation divided by interest expense (21/22). |
| *PPE* | Net property, plant and equipment divided by total assets (tangibility ratio) (42/44). |
| *SGA* | Selling, general and administrative expense divided by sales (1/2). |
| *SIZE* | Natural log of total assets at the beginning of credit watch Ln (44). |
| *RECESSION* | Dummy variable =1 if the month of credit watch announcement occurs in a recession as defined by the U.S. Federal Reserve |
| *LENGTH* | The number of calendar days between the beginning and the end of credit watch. We also employ an alternative definition based on trading days. |

Table 2 contains definitions of variables. "Firm Recovery" variables are measured employing data for the most recent quarter prior to the credit watch.

# Table 3
# Earnings Management around the Credit Watch Period

**Panel A: Mean Comparison**

| Firm Actions | Sample Size | N with Data Pre & Post | Credit Rating Outcome | Pre-Credit Watch | During Credit Watch | Post-Credit Watch | Comparison: During vs. Pre | Comparison: During vs. Post |
|---|---|---|---|---|---|---|---|---|
| **Earnings Management** | | | | | | | | |
| *Adj_ABACC* | 471 | 351 | Confirmed | -0.17% (-1.30) | 0.68%*** (3.90) | -0.16% (-1.20) | 0.85%*** (3.78) | 0.84%*** (3.82) |
| | 758 | 583 | Downgraded | 0.13% (1.20) | -0.18% (-1.48) | 0.09% (0.82) | -0.31%* (-1.81) | -0.27%* (-1.68) |
| *Adj_ABCFO* | 471 | 423 | Confirmed | 0.49%*** (4.50) | 0.08% (0.52) | 0.59%*** (5.40) | -0.42%** (-2.54) | -0.52%*** (-3.04) |
| | 758 | 713 | Downgraded | 0.09% (0.95) | 0.69%*** (6.37) | 0.51%*** (5.70) | 0.60%*** (4.64) | 0.18% (1.25) |
| *Adj_ABPROD* | 471 | 428 | Confirmed | 0.48%*** (2.73) | 0.93%*** (4.27) | 0.30%* (1.77) | 0.45%*** (2.61) | 0.63%*** (3.49) |
| | 758 | 699 | Downgraded | -0.03% (-0.21) | -0.22% (-1.38) | -0.06% (-1.39) | -0.19% (-1.55) | -0.16% (-1.24) |
| *Adj_ABEXP* | 471 | 109 | Confirmed | -2.86%*** (-8.92) | -3.17%*** (-5.72) | -2.86%*** (-8.74) | -0.31% (-0.59) | -0.31% (-0.58) |
| | 758 | 193 | Downgraded | -2.20%*** (-7.69) | -2.82%*** (-8.23) | -2.32%*** (-8.22) | -0.62%*** (-2.61) | -0.50%** (-2.17) |
| *Adj_REM1* | 471 | 399 | Confirmed | -0.02% (-0.10) | 0.75%** (2.35) | -0.29% (-1.19) | 0.78%*** (2.63) | 1.04%*** (3.59) |
| | 758 | 685 | Downgraded | -0.10% (-0.54) | -0.93%*** (-4.19) | -0.56%*** (-3.06) | -0.83%*** (-3.83) | -0.37% (-1.59) |
| *Adj_REM2* | 471 | 104 | Confirmed | 2.48%*** (4.54) | 2.75%*** (4.20) | 2.24%*** (4.02) | 0.27% (0.51) | 0.51% (0.93) |
| | 758 | 189 | Downgraded | 2.15%*** (4.49) | 2.24%*** (4.14) | 1.85%*** (3.97) | 0.09% (0.27) | 0.39% (1.06) |

**Panel B: Median Comparison**

| Firm Actions | Sample Size | N with Data Pre & Post | Credit Rating Outcome | Pre-Credit Watch | During Credit Watch | Post-Credit Watch | Comparison: During vs. Pre | Comparison: During vs. Post |
|---|---|---|---|---|---|---|---|---|
| **Earnings Management** | | | | | | | | |
| *Adj_ABACC* | 471 | 351 | Confirmed | -0.10% (-1.14) | 0.43%*** (4.33) | -0.16% (-1.61) | 0.51%*** (3.59) | 0.49%*** (4.09) |
| | 758 | 583 | Downgraded | 0.11% (1.12) | -0.18%* (-1.66) | 0.08% (-0.64) | -0.12% (-1.61) | -0.20% (-1.39) |
| *Adj_ABCFO* | 471 | 423 | Confirmed | 0.48%*** (5.07) | 0.11% (1.29) | 0.42%*** (5.33) | -0.21%** (-2.27) | -0.24%*** (-2.97) |
| | 758 | 713 | Downgraded | 0.14%* (1.71) | 0.59%*** (8.33) | 0.40%*** (5.56) | 0.42%*** (4.85) | 0.14% (1.31) |
| *Adj_ABPROD* | 471 | 428 | Confirmed | -0.10% (-0.92) | 0.14%** (2.49) | -0.22% (-0.10) | 0.31%*** (3.05) | 0.36%*** (3.41) |
| | 758 | 699 | Downgraded | -0.17% (-1.49) | -0.34%*** (-2.66) | -0.29% (-1.42) | -0.07% (-1.42) | -0.13%* (-1.94) |
| *Adj_ABEXP* | 471 | 109 | Confirmed | -2.87%*** (-6.99) | -2.51%*** (-6.91) | -2.85%*** (-7.14) | -0.03% (-0.27) | -0.08% (-0.42) |
| | 758 | 193 | Downgraded | -2.10%*** (-6.94) | -2.40%*** (-7.85) | -1.88%*** (-7.14) | -0.29%** (-2.41) | -0.10% (-1.48) |
| *Adj_REM1* | 471 | 399 | Confirmed | -0.67% (-1.32) | -0.03% (0.85) | -0.57%** (-2.22) | 0.50%** (2.57) | 0.68%*** (3.32) |
| | 758 | 685 | Downgraded | -0.40%* (-1.82) | -1.02%*** (-5.80) | -0.59%*** (-3.71) | -0.70%*** (-4.16) | -0.35%* (-1.91) |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| *Adj_REM2* | 471 | 104 | Confirmed | 2.14%$^{***}$<br>(4.02) | 1.69%$^{***}$<br>(3.98) | 2.78%$^{***}$<br>(3.88) | 0.19%<br>(-0.14) | -0.29%<br>(-0.48) |
| | 758 | 189 | Downgraded | 2.60%$^{***}$<br>(4.40) | 2.25%$^{***}$<br>(4.18) | 1.56%$^{***}$<br>(3.93) | -0.21%<br>(-0.04) | -0.28%<br>(-0.76) |

Table 3 presents mean (Panel A) and median (Panel B) values of our key variables across confirmed and downgraded firms. There are 471 confirmed firms and 758 downgraded firms in our sample, however for a small number of firms pre- and post-credit watch figures are not available. For *Adj_ABEXP* and *Adj_REM2*, data are only available for 453 out of 1,229 credit watches (see Table 2), and only a subset of these 453 have data pre- and post-credit watch. The above figures are based on firms for which we have all pre- and post-credit watch data. All values are tested for significance against zero. We also report differences of the key variables between (i) the credit watch period and pre-credit watch period and (ii) the credit watch period and post-credit watch period, with *t*-tests used for mean values and Wilcoxon rank-sum tests for median values. The pre- and post-credit watch periods are of equal length to the credit watch period. *t*-statistics and *z*-values are reported in the parentheses in Panels A and B, respectively. $^{***, **, *}$ indicate a significance level of 1%, 5% and 10%, respectively. All variables are defined in Table 2.

# Table 4
# Is Earnings Management during the Credit Watch Associated with the Credit Watch Outcome?

| **Estimations** | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| **Earnings Management** | | | | | | |
| *Adj_ABACC* | 4.6753** (2.41) | | | | | |
| *Adj_ABCFO* | | -6.6935*** (-2.92) | | | | |
| *Adj_ABPROD* | | | 4.2857** (2.38) | | | |
| *Adj_ABEXP* | | | | 0.4707 (0.20) | | |
| *Adj_REM1* | | | | | 3.8822*** (3.06) | |
| *Adj_REM2* | | | | | | 1.8659 (1.04) |
| **Recovery Control** | | | | | | |
| *RATING* | -0.1973*** (-6.86) | -0.1949*** (-6.69) | -0.1989*** (-6.95) | -0.2493*** (-4.80) | -0.1953*** (-6.77) | -0.2434*** (-4.69) |
| *LENGTH* | 0.0007** (2.10) | 0.0007** (2.01) | 0.0007** (2.09) | 0.0002 (0.41) | 0.0007** (2.06) | 0.0002 (0.40) |
| *INTCOVER* | 0.0276** (2.44) | 0.0271** (2.40) | 0.0301*** (2.62) | 0.0135 (1.07) | 0.0287** (2.51) | 0.0156 (1.21) |
| *PPE* | 0.388 (1.11) | 0.4810 (1.35) | 0.5563 (1.56) | 1.6190** (2.28) | 0.6101* (1.70) | 1.7771** (2.45) |
| *SGA* | -2.5014** (-4.34) | -2.4138*** (-4.21) | -1.8411*** (-2.95) | -1.1603 (-1.18) | -1.8569*** (-3.07) | -0.4069 (-0.38) |
| *SIZE* | 0.1911*** (3.47) | 0.1854*** (3.32) | 0.1849*** (3.34) | 0.2494*** (2.68) | 0.1825*** (3.28) | 0.2539*** (2.73) |
| *RECESSION* | -0.5676*** (-3.32) | -0.5594*** (-3.19) | -0.5593*** (-3.27) | -0.7680*** (-2.71) | -0.5554*** (-3.20) | -0.7912*** (-2.78) |
| *Constant* | 0.9229** (2.28) | 0.8875** (2.18) | 0.7421* (1.80) | 0.6163 (0.81) | 0.6968* (1.69) | 0.2384 (0.32) |
| *Sector Dummy* | Yes | Yes | Yes | Yes | Yes | Yes |
| *N* | 1,229 | 1,229 | 1,229 | 453 | 1,229 | 453 |
| *PSEUDO R2* | 0.0807 | 0.0824 | 0.0815 | 0.1057 | 0.0842 | 0.1074 |
| **Marginal Effects** | *Adj_ABACC* | *Adj_ABCFO* | *Adj_ABPROD* | *Adj_ABEXP* | *Adj_REM* | *Adj_REM2* |
| *% Δ Pr. Recovery for 1 SD increase in variable* | 3.69 | -4.56 | 4.51 | 0.58 | 5.52 | 3.33 |

Table 4 presents coefficients for the following model:

*Logit (=1 Confirmed; =0 Downgraded) = Constant + β1 Firm Actions + β2 RATING + β3 LENGTH + β4 INTCOVER + β5 PPE + β6 SGA + β7 SIZE + β8 RECESSION + βn* Sector Dummies

The dependent variable is a dummy indicating the credit watch outcome (1 = confirmed, 0 = downgraded). *Firm Actions* relate to each of the earnings management variables. We control for the initial credit rating, length of the credit watch period and firm characteristics prior to the credit watch and the macro-economic environment. To control for industry effects, we employ the sectors of the "12 Industry Portfolios" of Fama and French, from which we exclude the financial sector. We calculate White standard errors with firm level clustering. We present marginal effects of *Firm Actions* by holding other variables at their mean value and calculating the change in the probability of a rating confirmation when the test variable is increased by one standard deviation. *z*-values are given in brackets and ***, **, * indicate a significance level of 1%, 5% and 10%, respectively. All variables are defined in Table 2.

## Table 5
## Comparison of Firm Performance and Rating Changes Subsequent to a Negative Credit Watch

| | Confirmed | | Downgraded | |
|---|---|---|---|---|
| **Panel A. Firm Performance (N = 1,149 firms with non-missing $ROA_1$)** | | | | |
| | Mean | Median | Mean | Median |
| $ROA_0$ | 4.63%$^{***,\dagger}$<br>(8.98) | 2.45%$^{***,\dagger}$<br>(8.16) | 2.15%$^{***}$<br>(5.51) | 0.54%$^{***}$<br>(3.75) |
| $ROA_1$ | 3.55%$^{***,\dagger}$<br>(6.81) | 1.65%$^{***,\dagger}$<br>(6.23) | 2.30%$^{***}$<br>(5.94) | 0.50%$^{***}$<br>(4.30) |
| $\Delta ROA_{[0,1]}$ | -1.08%$^{***,\dagger}$<br>(-3.03) | -0.02%$^{**}$<br>(-2.21) | 0.15%<br>(0.63) | 0.00%<br>(0.83) |
| **Panel B. Rating Changes (N = 1,229)** | | | | |
| *% $DG_{[0,1]}$* | 16.56%$^{***,\dagger}$<br>(9.66) | | 25.99%$^{***}$<br>(16.30) | |
| *% $UG_{[0,1]}$* | 6.37%$^{***}$<br>(5.65) | | 4.49%$^{***}$<br>(5.96) | |
| *% $Stable_{[0,1]}$* | 74.31%$^{***,\dagger}$<br>(36.67) | | 63.85%$^{***}$<br>(36.57) | |
| *% Acquired, Liquidated, and $Withdrawn_{[0,1]}$* | 2.76%$^{***,\dagger}$<br>(3.65) | | 5.67%$^{***}$<br>(6.75) | |

Table 5 compares the one-year post-credit watch performance of firms which have their rating confirmed with firms which have their rating downgraded. $ROA_t$ is the industry-adjusted ROA for the year of the credit watch (t = 0) and the year after the credit watch (t = 1). We follow Denis and Kruse (2000) and we create portfolios based on SIC code employing all firms in the Compustat database. For each firm, a matched portfolio is formed during the credit watch year with the same 2-digit SIC. The industry adjusted ROA is therefore the ROA of the credit watch firm *minus* the average ROA of the matched portfolio. % Acquired, Liquidated and Withdrawn measures the frequency with which firms are acquired, liquidated or have their rating withdrawn in the year following the credit watch. In Panel A, we report *t*-tests for the means and Wilcoxon's rank-sum tests for the medians (z-values). In Panel B, the proportions of downgraded and confirmed firms are tested against zero (*t*-tests) and Confirmed and Downgraded are tested for the difference in proportions (*z*-test). $^{***,**,*}$ indicate a statistical difference from zero with a significance level of 1%, 5% and 10%, respectively. '†' denotes statistical difference between firms with Confirmed and Downgraded ratings at a 5% level. All variables are defined in Table 2.

## Table 6
## Trade-off between Accruals-based and Real Earnings Management

### Panel A: Pearson Correlation Matrix between Earnings Management Measures

| | *Adj_ABACC* | *Adj_ABACC _IDIOSHOCK1* | *Adj _ABCFO* | *Adj _ABPROD* | *Adj _ABEXP* | *Adj_REM1* | *Adj_REM2* |
|---|---|---|---|---|---|---|---|
| *Adj_ABACC* | 1 | | | | | | |
| *Adj_ABACC_ISHOCK1* | 0.2327*** | 1 | | | | | |
| *Adj_ABCFO* | -0.3674*** | -0.1301*** | 1 | | | | |
| *Adj_ABPROD* | 0.1603*** | 0.0601* | -0.3127*** | 1 | | | |
| *Adj_ABEXP* | 0.0001 | 0.1362*** | -0.2772*** | -0.1972*** | 1 | | |
| *Adj_REM1* | 0.2959*** | 0.1066*** | -0.7096*** | 0.8902*** | -0.0106 | 1 | |
| *Adj_REM2* | 0.1171** | -0.0471 | -0.0304 | 0.7356*** | -0.8092*** | 0.5478*** | 1 |

Panel A presents the Pearson correlation matrix for our earnings management proxies. ***, **, * indicate a significance level of 1%, 5% and 10%, respectively. All variables are defined in Table 2.

### Panel B: Regression Analysis of Trade-off

| | **2SLS** | | | | **OLS** | |
|---|---|---|---|---|---|---|
| | **(1)** | **(2)** | **(3)** | **(4)** | **(5)** | **(6)** |
| **Stage** | ***First*** | ***Second*** | ***First*** | ***Second*** | ***First*** | ***Second*** |
| **Dep Y of Each Stage** | ***AEM*** | ***REM*** | ***REM*** | ***AEM*** | ***REM*** | ***AEM*** |
| *Fitted REM* | | | | 0.0466 | | 0.3167*** |
| | | | | (0.38) | | (3.25) |
| *Fitted AEM* | | 1.8810** | | | | |
| | | (2.40) | | | | |
| *Unfitted REM* | | | | | | 0.1773*** |
| | | | | | | (5.59) |
| ***Common Controls for AEM*** | | | | | | |
| *LENGTH* | -0.0004 | 0.0012 | 0.0007 | -0.0004 | 0.0007 | -0.0005 |
| | (-0.67) | (0.90) | (0.64) | (-0.73) | (0.64) | (-0.86) |
| *NOA* | -0.0042** | -0.0021 | -0.0041 | -0.0041 | -0.0041 | -0.0053* |
| | (-2.39) | (-0.43) | (-0.64) | (-1.18) | (-0.64) | (-1.68) |
| *OPCYCLE* | 0.0000 | -0.0002*** | -0.0002*** | 0.0000 | -0.0002*** | 0.0001** |
| | (1.25) | (-3.73) | (-3.87) | (0.77) | (-3.87) | (2.46) |
| *ROA* | -0.0106 | -0.0752** | -0.0611** | -0.0060 | -0.0611** | 0.0225 |
| | (-0.64) | (-2.15) | (-2.20) | (-0.40) | (-2.20) | (1.17) |
| *SIZE* | -0.0011 | -0.0004 | -0.0010 | -0.0005 | -0.0010 | 0.0009 |
| | (-1.34) | (-0.18) | (-0.45) | (-0.42) | (-0.45) | (0.84) |
| *BM* | -0.0045 | 0.0085 | 0.0068 | -0.0027 | 0.0068 | -0.0028 |
| | (-1.45) | (1.20) | (1.14) | (-0.84) | (1.14) | (-0.90) |
| ***Unique Controls AEM*** | | | | | | |
| *LITIGATION* | -0.0089* | | -0.0248*** | -0.0072 | -0.0248*** | -0.0084* |
| | (-1.88) | | (-2.93) | (-1.27) | (-2.93) | (-1.84) |
| *BIGN* | -0.0086* | | -0.0071 | -0.0073 | -0.0071 | -0.0063 |
| | (-1.67) | | (-0.77) | (-1.45) | (-0.77) | (-1.10) |
| *TENURE* | 0.0016 | | 0.0026 | 0.0020 | 0.0026 | 0.0011 |
| | (0.68) | | (0.63) | (0.90) | (0.63) | (0.49) |
| ***Unique Controls REM*** | | | | | | |
| *MSHARE* | 0.0009 | 0.0171* | 0.0178** | | 0.0178** | -0.0045 |
| | (0.18) | (1.77) | (2.15) | | (2.15) | (-0.91) |
| *Z* | -0.0009 | 0.0062*** | 0.0047*** | | 0.0047*** | -0.0025** |
| | (-1.05) | (3.34) | (3.03) | | (3.03) | (-2.39) |
| *MTR* | 0.0018 | 0.0458 | 0.0401 | | 0.0401 | -0.0139 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | (0.12) | (1.54) | (1.54) | | (1.54) | (-1.02) |
| Constant | 0.0433*** | -0.0525 | -0.0145 | 0.0310** | -0.0145 | 0.0276 |
| | (3.27) | (-1.32) | (-0.59) | (2.39) | (-0.59) | (1.42) |
| Sector and Year Control | Yes | Yes | Yes | Yes | Yes | Yes |
| $R^2$ | 0.0770 | 0.1290 | 0.1160 | 0.1168 | 0.1160 | 0.1732 |
| N | 1024 | 1024 | 1024 | 1024 | 1024 | 1024 |
| Hausman Test (F) | 4.25 | | 1.17 | | | |
| (*p*-value) | (0.04) | | (0.28) | | | |
| Weak Instrument Test (Partial | 2.35 | | 6.38 | | | |
| (*p*-value) | (0.07) | | (0.00) | | | |
| Overidentification Test ($\chi^2$) | 1.65 | | 0.11 | | | |
| (*p*-value) | (0.44) | | (0.94) | | | |

In Panel B of Table 10, AEM is accruals-based earnings management and REM is real earnings management. Columns (1) – (4) present the 2SLS results of estimating the following structural models:

*Adj_ABACC* = β0 + [Common Controls: β1 *LENGTH* + β2 *NOA* + β3 *OPCYCLE* + β4 *ROA* + β5 *SIZE* + β6 *BM*] + [Unique Exogenous: β7 *LITIGATION* + β8 *BIGN* + β9 *TENURE*] + β10 *Adj_REM1* + Sector Dummy + Year Dummy + Error

*Adj_REM1* = β0 + [Common Controls: β1 *LENGTH* + β2 *NOA* + β3 *OPCYCLE* + β4 *ROA* + β5 *SIZE* + β6 *BM*] + [Unique Exogenous: β7 *MSHARE* + β8 *Z* + β9 *MTR*] + β10 *Adj_ABACC* + Sector Dummy + Year Dummy + Error

At Stage 1 we estimate the reduced form equations, substituting for the rhs values of *Adj_ABACC* and *Adj_REM1* employing the variables derived from the above equations to arrive at fitted values of *Adj_ABACC* and *Adj_REM1*. At Stage 2 we replace the rhs values of *Adj_ABACC* and *Adj_REM1* with their fitted values and estimate the above equations.

Columns (5) – (6) presents the OLS results of estimating the following models:

*Adj_REM1* = β0 + β1 *LENGTH* + β2 *NOA* + β3 *OPCYCLE* + β4 *ROA* + β5 *SIZE* + β6 *BM* + β7 *LITIGATION* + β8 *BIGN* + β9 *TENURE* + β10 *MSHARE* + β11 *Z* + β12 *MTR* + Sector Dummy + Year Dummy + Error (3);

*Adj_ABACC* = β0 + β1 *LENGTH* + β2 *NOA* + β3 *OPCYCLE* + β4 *ROA* + β5 *SIZE* + β6 *BM* + β7 *LITIGATION* + β8 *BIGN* + β9 *TENURE* + β10 *MSHARE* + β11 *Z* + β12 *MTR* + β13 *Fitted Adj_REM1* +β14 *Unfitted Adj_REM1* + Sector Dummy + Year Dummy + Error (4);

*Adj_ABACC* and *_REM1* are earnings management variables defined in Table 2. *LENGTH* is the log of the length of credit watch. *NOA* is net operating assets (Annual Compustat 144 + 9 + 34 - Annual Compustat 1) scaled by sales revenue (Annual Compustat 12). *OPCYCLE* is the operating cycle (days receivable plus days inventory less days payable at the end of the last year prior to the credit watch). *LITIGATION* is a dummy equal to 1 if the sample firm operates in industries with SIC codes 2833-2836, 3570-3577, 3600-3674, 7371-7379, 8731-8734. *BIGN* is a dummy equal to 1 for big N auditors (see Section 6.7) and *TENURE* is the length of audit tenure. *MSHARE* is firm sales divided by total industry sales at the close of the year prior to the credit watch, *Z* is Altman's *z*-score at the close of the year prior to the credit watch and *MTR* is the marginal tax rate. We also include return on assets (*ROA*), *SIZE* and book to market (*BM*). *z*-values (*t*-values) are given in brackets and ***, **, * indicate a significance level of 1%, 5% and 10%, respectively.

# Table 7
# Earnings Management & Credit Watch Outcome: Pre-SOX and Post-SOX Periods

| | Panel A: Pre-SOX Period | | | | | Panel B: Post-SOX Period | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Estimations** | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| **Earnings Management** | | | | | | | | | | |
| *Adj_ABACC* | 6.1859** | | | | | 2.5541 | | | | |
| | (2.21) | | | | | (0.87) | | | | |
| *Adj_ABCFO* | | -8.5613** | | | | | -5.6997* | | | |
| | | (-2.39) | | | | | (-1.66) | | | |
| *Adj_ABPROD* | | | 2.1465 | | | | | 8.6536*** | | |
| | | | (0.90) | | | | | (3.49) | | |
| *Adj_ABEXP* | | | | 1.5868 | | | | | -0.0749 | |
| | | | | (0.49) | | | | | (-0.02) | |
| *Adj_REM1* | | | | | 3.1349* | | | | | 5.6240*** |
| | | | | | (1.76) | | | | | (3.06) |
| **Recovery Control** | | | | | | | | | | |
| *RATING* | -0.1537*** | -0.1511*** | -0.1575*** | -0.2875*** | -0.1547*** | -0.2509*** | -0.2439*** | -0.2466*** | -0.1850** | -0.2408*** |
| | (-3.99) | (-3.91) | (-4.11) | (-3.63) | (-4.04) | (-4.85) | (-4.66) | (-4.65) | (-2.20) | (-4.54) |
| *LENGTH* | 0.0006* | 0.0006* | 0.0006** | 0.0004 | 0.0006* | 0.0026** | 0.0025** | 0.0027*** | 0.0008 | 0.0026** |
| | (1.94) | (1.91) | (1.97) | (0.70) | (1.95) | (2.55) | (2.45) | (2.59) | (0.46) | (2.51) |
| *INTCOVER* | -0.0034 | -0.0042 | -0.0015 | -0.0031 | -0.0020 | 0.0533*** | 0.0509*** | 0.0529*** | 0.0223 | 0.0500*** |
| | (-0.21) | (-0.26) | (-0.09) | (-0.15) | (-0.12) | (3.18) | (3.06) | (3.12) | (1.14) | (2.97) |
| *PPE* | 0.6154 | 0.7777* | 0.6693 | 1.3636 | 0.7823* | 0.2989 | 0.3563 | 0.7711 | 2.1397* | 0.6741 |
| | (1.36) | (1.71) | (1.49) | (1.49) | (1.72) | (0.54) | (0.63) | (1.32) | (1.86) | (1.16) |
| *SGA* | -3.1240*** | -3.0563*** | -2.8094*** | -2.1494 | -2.6879*** | -1.9190** | -1.8313** | -0.2964 | -0.4704 | -0.7532 |
| | (-3.60) | (-3.57) | (-3.08) | (-1.43) | (-3.01) | (-2.31) | (-2.22) | (-0.33) | (-0.32) | (-0.86) |
| *SIZE* | 0.2147*** | 0.2092*** | 0.2100*** | 0.2969** | 0.2071*** | 0.1144 | 0.1039 | 0.1073 | 0.1198 | 0.1010 |
| | (2.84) | (2.72) | (2.73) | (2.22) | (2.70) | (1.19) | (1.07) | (1.11) | (0.73) | (1.03) |
| *RECESSION* | -0.5149** | -0.4784* | -0.5264** | -0.7406 | -0.4980* | -0.6380*** | -0.6465*** | -0.6268*** | -0.8834** | -0.6386*** |
| | (-2.00) | (-1.84) | (-2.05) | (-1.64) | (-1.93) | (-2.73) | (-2.73) | (-2.62) | (-2.10) | (-2.65) |
| *Constant* | 0.4665 | 0.3900 | 0.4610 | 1.6080 | 0.3462 | 1.5334** | 1.5235** | 0.9166 | -0.1922 | 1.0827 |
| | (0.91) | (0.76) | (0.91) | (1.47) | (0.67) | (2.27) | (2.27) | (1.31) | (-0.15) | (1.58) |
| *Sector Dummy* | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| *N* | 692 | 692 | 692 | 276 | 692 | 537 | 537 | 537 | 177 | 537 |
| *PSEUDO $R^2$* | 0.0841 | 0.0851 | 0.0782 | 0.1499 | 0.0817 | 0.1095 | 0.1126 | 0.1231 | 0.0876 | 0.1219 |
| **Marginal Effects** | 4.99% | -5.37% | 2.12% | 1.93% | 4.12% | 1.86% | -4.22% | 9.71% | -0.09% | 8.66% |

Table 7 summarises the relationship between *firm actions* and the credit watch outcome before and after the passage of the Sarbanes-Oxley Act (SOX) in 2002. We estimate the following equation on the pre- and post-SOX periods separately:

*Logit (=1 Confirmed; =0 Downgraded) = Constant + β1 Firm Actions + β2 RATING + β3 LENGTH + β4 INTCOVER + β5 PPE + β6 SGA + β7 SIZE + β8 RECESSION + βn* Sector Dummies

The dependent variable is a dummy indicating the credit watch outcome (1 = confirmed, 0 = downgraded). *Firm Actions* relate to each of the earnings management variables. We control for the initial credit rating, length of the credit watch period and firm characteristics prior to the credit watch and the macro-economic environment. To control for industry effects, we employ the sectors of the "12 Industry Portfolios" of Fama and French, from which

we exclude the financial sector. We calculate White standard errors with firm level clustering. We present marginal effects of *Firm Actions* by holding other variables at their mean value and calculating the change in the probability of a rating confirmation when the test variable is increased by one standard deviation. *z*-values are given in brackets and $^{***}$, $^{**}$, $^{*}$ indicate a significance level of 1%, 5% and 10%, respectively. All variables are defined in Table 2.

**The following tables are available from the authors on request**

# Supplementary Table 1

## Idiosyncratic Shocks and Discretionary Accruals

### Panel A: Earnings Management Around the Credit Watch Period

**Mean Comparison**

| Firm Actions | Sample Size | N with Data Pre and | Credit Rating Outcome | Pre-Credit Watch | During Credit Watch | Post-Credit Watch | Comparison: During versus Pre | Comparison: During versus Post |
|---|---|---|---|---|---|---|---|---|
| **Earnings Management** | | | | | | | | |
| *Adj_ABACC_IDIOSHOCK1* | 471 | 309 | Confirmed | -0.23% (-0.97) | 0.62%*** (3.38) | -0.79%*** (-3.58) | 0.85%*** (3.44) | 1.41%*** (5.21) |
| | 758 | 505 | Downgraded | -0.42%** (-2.45) | -0.36%** (-2.17) | -0.87%*** (-4.46) | 0.06% (-0.27) | 0.51%** (2.09) |
| *Adj_ABACC_IDIOSHOCK2* | 471 | 366 | Confirmed | -0.07% (-0.37) | 0.66%*** (3.96) | -0.28% (-1.63) | 0.73%*** (3.36) | 0.94%*** (4.21) |
| | 758 | 592 | Downgraded | -0.06% (-0.43) | -0.07%*** (-0.57) | -0.31%** (-2.06) | -0.01% (-0.10) | 0.24% (1.22) |

**Median Comparison**

| Firm Actions | Sample Size | N with Data Pre and Post | Credit Rating Outcome | Pre-Credit Watch | During Credit Watch | Post-Credit Watch | Comparison: During versus Pre | Comparison: During versus Post |
|---|---|---|---|---|---|---|---|---|
| **Earnings Management** | | | | | | | | |
| *Adj_ABACC_IDIOSHOCK1* | 471 | 309 | Confirmed | -0.15% (-1.10) | 0.56%*** (3.08) | -0.43%*** (-3.36) | 0.39%*** (3.32) | 0.72%*** (4.60) |
| | 758 | 505 | Downgraded | -0.28%*** (-2.70) | -0.22%** (-2.01) | -0.76%*** (-4.50) | 0.17% (0.31) | 0.26%* (1.91) |
| *Adj_ABACC_IDIOSHOCK1* | 471 | 366 | Confirmed | 0.02% (-0.15) | 0.20%*** (3.51) | -0.17%* (-1.74) | 0.27%*** (3.06) | 0.55%*** (3.80) |
| | 758 | 592 | Downgraded | 0.00% (-0.31) | 0.00% (-0.52) | -0.17%** (-2.55) | -0.10% (-0.40) | 0.04% (0.69) |

### Panel B: Earnings Management and the Credit Watch Outcome

| Estimations | (1) | (2) |
|---|---|---|
| **Earnings Management** | | |
| *Adj_ABACC_IDIOSHOCK1* | 4.4587** (2.45) | |
| *Adj_ABACC_IDIOSHOCK2* | | 5.1077*** (2.66) |

In this table, we repeat the analyses of Tables 3 and 4 incorporating idiosyncratic risk into our measure of discretionary accruals. *IDIOSHOCK* is the measure of idiosyncratic risk of the firm as set out in Owens et al. (2017). *Adj_ABACC_IDIOSHOCK1* incorporates idiosyncratic risk into the estimations of total and discretionary accruals (see Equations 10-12). *Adj_ABACC_IDIOSHOCK1* equals the discretionary accruals of the firm minus the average discretionary accrual of the industry/ROA/quarter matched portfolio. *Adj_ABACC_IDIOSHOCK2* does not incorporate idiosyncratic risk into the estimation of total and discretionary accruals (see Equations 1 and 2), and equals the discretionary accruals of the firm minus the average discretionary accrual of the industry/ROA/quarter/IDIOSHOCK portfolio.
In relation to Panel A, there are 471 confirmed firms and 758 downgraded firms in our sample, however for a small number of firms pre- and post-credit watch figures are not available. The above figures are based on firms for which we have all pre- and post-credit watch data. The values are tested for significance against zero. We also report differences of the key variables between (i) the credit watch period and pre-credit watch period and (ii) the credit watch period and post-credit watch period, with *t*-tests used for mean values and Wilcoxon rank-sum tests for median values. The pre- and post-credit watch periods are of equal length to the credit watch period. *t*-statistics (*z*-values) are reported in parentheses. ***, **, * indicate a significance level of 1%, 5% and 10%, respectively. All variables are defined in Table 2.
Panel B presents the coefficient for *β1* in relation to the following estimation, which repeats the analysis in Table 4:

*Logit (=1 Confirmed; =0 Downgraded) = Constant + β1 Adj_ABACC_IDIOSHOCK1* (2) *+ β2 RATING + β3 LENGTH + β4 INTCOVER + β5 PPE + β6 SGA + β7 SIZE + β8 RECESSION + βn* Sector Dummies

The dependent variable is a dummy indicating the credit watch outcome (1 = confirmed while 0 = downgraded). *Adj_ABACC_IDIOSHOCK1* (2) relates to abnormal accruals incorporating IDIOSHOCK, as defined for Panel A. All other variables are as set out for Table 4. *z*-values are given in brackets and $^{***, **, *}$ indicate a significance level of 1%, 5% and 10%, respectively. All variables are defined in Table 2.

# Supplementary Table 2
# Univariate Tests of Earnings Management in the Credit Watch Period: Short Versus Long Credit Watch
# (N=1229)

| | Panel A: Short Credit Watch | | | | Panel B: Long Credit Watch | | | |
|---|---|---|---|---|---|---|---|---|
| | All | Confirmed | Downgraded | Comparison: Confirmed versus Downgraded | All | Confirmed | Downgraded | Comparison: Confirmed versus Downgraded |
| N | 543 | 193 | 350 | | 686 | 278 | 408 | |
| **Earnings Management** | | | | | | | | |
| *Adj_ABACC* Mean | 543 | 0.59%$^{**}$ (2.28) | -0.04% (-0.18) | 0.63%$^{**}$ (1.97) | 686 | 0.46%$^{**}$ (2.22) | -0.19% (-1.36) | 0.65%$^{***}$ (2.70) |
| *Adj_ABACC* Median | 543 | 0.58%$^{***}$ (2.76) | -0.12% (-0.36) | 0.70%$^{**}$ (2.34%) | 686 | 0.26%$^{**}$ (2.54) | -0.21%$^{*}$ (-1.92) | 0.47%$^{***}$ (3.09) |
| *Adj_ABCFO* Mean | 543 | -0.01% (-0.02) | 0.82%$^{***}$ (4.18) | -0.83%$^{**}$ (-2.52) | 686 | 0.09% (0.66) | 0.57%$^{***}$ (5.61) | -0.48%$^{***}$ (-2.86) |
| *Adj_ABCFO* Median | 543 | 0.00% (0.98) | 0.67%$^{***}$ (5.57) | -0.67%$^{***}$ (-3.41) | 686 | 0.18% (1.45) | 0.55%$^{***}$ (6.50) | -0.37%$^{***}$ (-2.96) |
| *Adj_ABPROD* Mean | 543 | 1.59%$^{***}$ (3.99) | -0.33% (-1.21) | 1.92%$^{***}$ (4.05) | 686 | 0.71%$^{***}$ (3.02) | -0.06% (-0.33) | 0.77%$^{***}$ (2.69) |
| *Adj_ABPROD* Median | 543 | 0.37%$^{***}$ (3.03) | -0.60%$^{***}$ (-2.89) | 0.97%$^{***}$ (4.14) | 686 | 0.15% (1.57%) | -0.23% (-1.34) | 0.38%$^{**}$ (2.12) |
| *Adj_ABEXP* Mean | 193 | -4.02%$^{***}$ (-5.26) | -2.34%$^{***}$ (-4.93) | -1.68%$^{**}$ (-1.97) | 260 | -2.06%$^{***}$ (-4.84) | -2.46%$^{***}$ (-5.83) | 0.40% (0.63) |
| *Adj_ABEXP* Median | 193 | -3.47%$^{***}$ (-5.96) | -2.20%$^{***}$ (-4.81) | -1.27%$^{**}$ (-2.08) | 260 | -2.13%$^{***}$ (-4.84) | -2.23%$^{***}$ (-5.93) | 0.10% (0.02) |

In this table we present mean and median values of our key variables across confirmed and downgraded firms for the short credit watches (Panel A) and long credit watches (Panel B). Short credit watches comprise 543 credit watches with a duration of three months (63 trading days) or less (see Table 1: 124 + 419 = 543). Long credit watches have a duration of greater than three months. All values are tested for significance against zero and differences between Confirmed and Downgraded firms are also reported, with *t*-tests used for mean values and Wilcoxon rank-sum tests for median values. $^{***,\ **,\ *}$ indicate a significance level of 1%, 5% and 10%, respectively. All variables are defined in Table 2.

# Supplementary Table 3
# Earnings Management & Credit Watch Outcome: Short Versus Long Credit Watch

| | Panel A: Short Credit Watch (Length<= 3 months) | | | | | Panel B: Long Credit Watch (Length > 3 months) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Estimations** | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| **Earnings Management** | | | | | | | | | | |
| *Adj_ABACC* | 4.4123* | | | | | 5.4939* | | | | |
| | (1.70) | | | | | (1.83) | | | | |
| *Adj_ABCFO* | | -5.5901** | | | | | -8.8938** | | | |
| | | (-1.96) | | | | | (-2.27) | | | |
| *Adj_ABPROD* | | | 5.3664** | | | | | 2.8063 | | |
| | | | (2.01) | | | | | (1.08) | | |
| *Adj_ABEXP1* | | | | -1.8140 | | | | | 5.2100 | |
| | | | | (-0.60) | | | | | (1.46) | |
| *Adj_REM1* | | | | | 4.2790** | | | | | 3.4421* |
| | | | | | (2.35) | | | | | (1.85) |
| **Recovery Control** | | | | | | | | | | |
| *RATING* | -0.1916*** | -0.1896*** | -0.1918*** | -0.3978*** | -0.1861*** | -0.2127*** | -0.2089*** | -0.2143*** | -0.1785*** | -0.2115*** |
| | (-3.88) | (-3.79) | (-3.92) | (-3.72) | (-3.75) | (-5.89) | (-5.71) | (-5.89) | (-2.64) | (-5.80) |
| *LENGTH* | 0.0013 | 0.0011 | 0.0014 | -0.0064 | 0.0011 | 0.0007* | 0.0007* | 0.0007* | 0.0001 | 0.0007* |
| | (0.31) | (0.25) | (0.32) | (-0.87) | (0.25) | (1.89) | (1.74) | (1.81) | (0.21) | (1.78) |
| *INTCOVER* | 0.0558*** | 0.0527*** | 0.0559*** | 0.0408 | 0.0532*** | 0.0148 | 0.0155 | 0.0179 | 0.0130 | 0.0172 |
| | (3.11) | (2.92) | (3.00) | (1.21) | (2.90) | (1.15) | (1.16) | (1.35) | (0.85) | (1.29) |
| *PPE* | 0.0935 | 0.1754 | 0.3994 | 1.0655 | 0.4370 | 0.6287 | 0.7419 | 0.7038 | 2.0770** | 0.7682 |
| | (0.17) | (0.31) | (0.67) | (0.90) | (0.74) | (1.33) | (1.56) | (1.47) | (2.15) | (1.60) |
| *SGA* | -3.2151*** | -3.1389*** | -2.2432** | -3.2320* | -2.3948*** | -2.1328*** | -2.0142*** | -1.7509** | -0.7591 | -1.6216* |
| | (-3.59) | (-3.55) | (-2.38) | (-1.86) | (-2.64) | (-2.73) | (-2.58) | (-2.00) | (-0.57) | (-1.92) |
| *SIZE* | 0.1597* | 0.1509* | 0.1428 | 0.5175*** | 0.1374 | 0.2075*** | 0.2036*** | 0.2042*** | 0.0445 | 0.2040*** |
| | (1.77) | (1.66) | (1.55) | (3.09) | (1.49) | (2.91) | (2.83) | (2.85) | (0.34) | (2.84) |
| *RECESSION* | -0.7256*** | -0.7227*** | -0.7102*** | -0.3659 | -0.7048*** | -0.3805 | -0.3758 | -0.3751 | -1.3119*** | -0.3766 |
| | (-2.77) | (-2.67) | (-2.72) | (-0.83) | (-2.62) | (-1.59) | (-1.57) | (-1.57) | (-2.58) | (-1.57) |
| *Constant* | 1.4510** | 1.4315** | 1.1544 | 1.0104 | 1.1539 | 0.7014 | 0.6542 | 0.6459 | 1.2070 | 0.5610 |
| | (2.06) | (2.03) | (1.60) | (0.82) | (1.60) | (1.36) | (1.26) | (1.22) | (1.07) | (1.06) |
| *Sector Dummy* | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| *N* | 543 | 543 | 543 | 193 | 543 | 686 | 686 | 686 | 260 | 686 |
| *PSEUDO $R^2$* | 0.1006 | 0.1025 | 0.1061 | 0.1836 | 0.1086 | 0.0814 | 0.0826 | 0.0785 | 0.1081 | 0.0808 |
| **Marginal Effects** | 0.0366 | -0.0376 | 0.0642 | -0.0240 | 0.0702 | 0.0406 | -0.0461 | 0.0248 | 0.0592 | 0.0401 |

This table summarises the relationship between *firm actions* and credit watch outcome **for short and long credit watches separately**:

*Logit (=1 Confirmed; =0 Downgraded) = Constant + β1 Firm Actions + β2 RATING + β3 LENGTH + β4 INTCOVER + β5 PPE + β6 SGA + β7 SIZE + β8 RECESSION + βn* Sector Dummies

The dependent variable is a dummy indicating the credit watch outcome (1 = confirmed, 0 = downgraded). *Firm Actions* relate to each of the earnings management variables. We control for the initial credit rating, length of the credit watch period and firm characteristics prior to the credit watch and the macro-economic environment. To control for industry effects, we employ the sectors of the "12 Industry Portfolios" of Fama and French, from which we exclude

the financial sector. We calculate White standard errors with firm level clustering. We present marginal effects of *Firm Actions* by holding other variables at their mean value and calculating the change in the probability of a rating confirmation when the test variable is increased by one standard deviation. *z*-values are given in brackets and $^{***}$, $^{**}$, $^{*}$ indicate a significance level of 1%, 5% and 10%, respectively. All variables are defined in Table 2.

## Supplementary Table 4
## Earnings Management in the Presence of Target Rating (N=865)

### Panel A: Target Rating Via Ordered Probit Model

| **Dependant Variable**: *RATING* | | | |
|---|---|---|---|
| **Explanatory Variables** | (1) Our Model | (2) Alissa et al. (Table 1, page 133) | (3) Hovakimian et al. (Table 4, page 38) |
| *MTB* | 0.3042*** | 0.1071*** | 0.204*** |
| | (24.10) | (5.16) | (7.9) |
| *TANG* | 0.6042*** | 0.8492*** | 0.595*** |
| | (13.09) | (7.43) | (4.2) |
| *RD* | -0.1873 | 0.0090 | -0.989** |
| | (-0.62) | (1.14) | (-2.2) |
| *RDIND* | 0.2145*** | 0.2506*** | 0.234*** |
| | (10.92) | (5.03) | (4.3) |
| *SGA* | 0.7274*** | 0.2912*** | 1.117*** |
| | (8.53) | (2.92) | (5.1) |
| *PROFIT* | 3.0082*** | 3.0838*** | 3.362*** |
| | (27.91) | (17.72) | (15.6) |
| *SIZE* | 0.5111*** | 0.4108*** | 0.365*** |
| | (83.78) | (24.65) | (9.2) |
| *OPRISK* | -4.9051*** | -3.2372*** | -5.485*** |
| | (-28.03) | (-11.36) | (-13.3) |
| Industry Dummy | Yes | Yes | |
| Observations | 19,176 | 23,909 | 14,364 |
| LR $\chi^2$ | 14,191.15 | 12,013.93 | - |
| Log Likelihood | -44,756.70 | - | -49,724.0 |
| Pseudo-$R^2$ | 0.1368 | 0.1170 | - |

This table presents the coefficients of an ordered probit model designed to estimate the target rating of each of our sample companies in each of our sample years, 1989 through 2011. The method follows Hovakimian et al. (2009) and Alissa et al. (2013). The dependent variable is *RATING*, which is the cardinal value of S&P's issuer credit rating (e.g. AAA=21, AA+ = 20…. etc.). The rating is assumed to depend on the following firm characteristics: *MTB* is the market value of assets divided by total assets; *TANG* is the net plant, property and equipment divided by total assets; *RD* is the research and development expenses divided by sales; *RDIND* is indicator equal to one if the R&D expense is available in COMPUSTAT; *SGA* is the selling, general and administrative expenses divided by sales; *PROFIT* is the operating income before depreciation divided by lagged total assets; *OPRISK* is the standard deviation of *PROFIT* of the previous five years. Following Alissa et al., we control for industry effects by employing the sectors of the "12 Industry Portfolios" of Fama and French, from which we exclude the financial sector. Column (1) presents the coefficients for our sample while Columns (2) and (3) are abstracted from the Hovakimian and Alissa papers. *z*-values are given in brackets. ***, ** denote coefficients significant at a 1% and 5% level.

## Panel B: Earnings Management in the Presence of Target Rating

| **Estimations** | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| **Earnings Management** | | | | | |
| *Adj_ABACC* | 5.3443** | | | | |
| | (2.09) | | | | |
| *Adj_ABCFO* | | -5.3387** | | | |
| | | (-1.97) | | | |
| *Adj_ABPROD* | | | 4.8714*** | | |
| | | | (2.58) | | |
| *Adj_ABEXP* | | | | 1.6881 | |
| | | | | (0.61) | |
| *Adj_REM1* | | | | | 3.8875*** |
| | | | | | (2.78) |
| **Recovery Control** | | | | | |
| ***TARGET*** | 0.5799*** | 0.5617*** | 0.5572*** | 0.4622* | 0.5551*** |
| | (3.24) | (3.16) | (3.12) | (1.72) | (3.11) |
| *RATING* | -0.1735*** | -0.1773*** | -0.1784*** | -0.2766*** | -0.1748*** |
| | (-4.14) | (-4.26) | (-4.29) | (-4.33) | (-4.18) |
| *LENGTH* | 0.0007 | 0.0006 | 0.0007 | 0.0003 | 0.0007 |
| | (1.29) | (1.22) | (1.29) | (0.44) | (1.26) |
| *INTCOVER* | 0.0348** | 0.0351** | 0.0385*** | 0.0138 | 0.0363*** |
| | (2.52) | (2.54) | (2.74) | (0.97) | (2.61) |
| *PPE* | 0.1056 | 0.1338 | 0.2780 | 1.9658** | 0.3011 |
| | (0.22) | (0.27) | (0.57) | (2.29) | (0.62) |
| *SGA* | -1.3536** | -1.3318** | -0.5742 | 0.0132 | -0.6839 |
| | (-1.97) | (-1.98) | (-0.78) | (0.01) | (-0.95) |
| *SIZE* | 0.1023 | 0.0997 | 0.0956 | 0.3029*** | 0.0929 |
| | (1.36) | (1.32) | (1.25) | (2.62) | (1.22) |
| *RECESSION* | -0.4898** | -0.5028** | -0.5034*** | -0.8002** | -0.5006** |
| | (-2.51) | (-2.53) | (-2.58) | (-2.53) | (-2.53) |
| Constant | 0.1542 | 0.2218 | 0.0188 | -0.9306 | 0.0124 |
| | (0.28) | (0.40) | (0.03) | (-0.94) | (0.02) |
| Sector Dummy | Yes | Yes | Yes | Yes | Yes |
| N | 865 | 865 | 865 | 372 | 865 |
| PSEUDO $R^2$ | 0.0972 | 0.0964 | 0.0983 | 0.1171 | 0.0998 |
| **Marginal Effects** | ***TARGET*** | ***target*** | ***TARGET*** | ***TARGET*** | ***TARGET*** |
| % Δ Pr. Recovery 0 vs. 1 | 12.71 | 12.33 | 12.22 | 10.26 | 12.18 |

The above table presents coefficients for the following model:

*Logit (=1 Confirmed; =0 Downgraded) = Constant + β1 Firm Actions + β2TARGET + β3RATING + β4LENGTH + β5 INTCOVER + β6 PPE + β7 SGA + β8 SIZE + β9 RECESSION + βn* Sector Dummies

The estimations are the same as Table 4 with an additional variable representing the target rating. The dependent variable is a dummy indicating the credit watch outcome (1 = confirmed, 0 = downgraded). *TARGET* = 1 if the firm's rating at the start of the credit watch period is lower than or equal to its target rating. As before, *Firm Actions* relate to each of the earnings management variables. We control for the initial credit rating, length of the credit watch period and firm characteristics prior to the credit watch and the macro-economic environment. To control for industry effects, we employ the sectors of the "12 Industry Portfolios" of Fama and French, from which we exclude the financial sector. We calculate White standard errors with firm level clustering. We present marginal effects of *Firm Actions* by holding other variables at their mean value and calculating the change in the probability of a rating confirmation when the test variable is increased by one standard deviation. *z*-values are given in brackets and ***, **, * indicate a significance level of 1%, 5% and 10%, respectively. All variables are defined in Table 2.

# Supplementary Table 5
# Abnormal Production Expenses & Credit Watch Outcome: Manufacturing Versus Other Sectors

| **Panel A: Univariate Analysis** | | | |
|---|---|---|---|
| | **Other Sectors** | **Manufacturing Sector** | **Comparison: Manufacturing versus Other Sectors** |
| *Adj_ABPROD* Mean | 0.22% | 0.61% | -0.39% (-1.14) |
| *Adj_ABPROD* Median | -0.23% | 0.26% | -0.49%$^{*}$ (-1.67) |
| **Panel B: Regression Analysis** | | | |
| **Earnings Management** | | | |
| *Adj_ABPROD* | 4.7000$^{**}$ | 7.7612$^{**}$ | |
| | (2.33) | (2.06) | |
| **Recovery Control** | | | |
| *RATING* | -0.1695$^{***}$ | -0.4642$^{***}$ | |
| | (-5.99) | (-5.41) | |
| *LENGTH* | 0.0011$^{***}$ | -0.0005 | |
| | (3.30) | (-0.94) | |
| *INTCOVER* | 0.0245$^{**}$ | 0.0854$^{***}$ | |
| | (2.20) | (3.20) | |
| *PPE* | 0.7798$^{***}$ | -1.3644 | |
| | (2.73) | (-1.17) | |
| *SGA* | -1.3344$^{**}$ | -1.3966 | |
| | (-2.16) | (-0.78) | |
| *SIZE* | 0.1735$^{***}$ | 0.4629$^{***}$ | |
| | (3.03) | (3.20) | |
| *RECESSION* | -0.4862$^{***}$ | -0.8612$^{**}$ | |
| | (-2.58) | (-2.09) | |
| *Constant* | -0.0372 | 2.0649$^{**}$ | |
| | (-0.10) | (2.10) | |
| *Sector Dummy* | No | No | |
| *N* | 1005 | 224 | |
| *PSEUDO* $R^2$ | 0.0609 | 0.1757 | |
| **Marginal Effects** *% Δ Pr. Recovery for 1 SD increase in* ***Adj_ABPROD*** | 4.98 | 7.91 | |

Panel A of this table presents the mean and median difference test of abnormal production costs of manufacturing and non-manufacturing sectors with *t*-tests used for mean values and Wilcoxon rank-sum tests for median values. $^{c,}$ $^{**,}$ $^{a}$ indicate a significance level of 10%, 5% and 1%, respectively.

Panel B of this table presents the regression coefficients for the following model:

*Logit (=1 Confirmed; =0 Downgraded) = Constant + β1 Adj_ABPROD + β2 RATING + β3 LENGTH + β4 INTCOVER + β5 PPE + β6 SGA + β7 SIZE + β8 RECESSION*

The dependent variable is a dummy indicating the credit watch outcome (1 = confirmed, 0 = downgraded). *Adj_ABPROD* is the performance-adjusted abnormal production costs. We control for the initial credit rating, length of the credit watch period and firm characteristics prior to the credit watch and the macro-economic environment. To control for industry effects, we employ the sectors of the "12 Industry Portfolios" of Fama and French, from which we exclude the financial sector. We calculate White standard errors with firm level clustering. We present marginal effects of *Firm Actions* by holding other variables at their mean value and calculating the change in the probability of a rating confirmation when the test variable is increased by one standard deviation. *z*-values are given in brackets and $^{***,}$ $^{**,}$ $^{*}$ indicate a significance level of 1%, 5% and 10%, respectively. All variables are defined in Table 2.

## Supplementary Table 6
## The Impact of a Moody's Credit Watch.

## Modified Table 3

**Panel A: Mean Comparison**

| Firm Actions | Sample Size | N with Data Pre and Post | Credit Rating Outcome | Pre-Credit Watch | During Credit Watch | Post-Credit Watch | Comparison: during versus Pre | Comparison: during versus Post |
|---|---|---|---|---|---|---|---|---|
| **Earnings Management** | | | | | | | | |
| *Adj_ABACC* | 439 | 326 | Confirmed | –0.20% (–1.43) | 0.63%*** (3.79) | –0.14% (–1.00) | 0.83%*** (3.64) | 0.77%*** (3.49) |
| | 690 | 531 | Downgraded | 0.17% (1.51) | –0.11% (–0.84) | 0.11% (0.88) | –0.28% (–1.53) | –0.22% (–1.24) |
| *Adj_ABCFO* | 439 | 395 | Confirmed | 0.48%*** (4.15) | 0.09% (0.57) | 0.60%*** (5.28) | –0.39%** (–2.31) | –0.51%*** (–2.89) |
| | 690 | 650 | Downgraded | 0.09% (0.89) | 0.68%*** (6.34) | 0.54%*** (5.65) | 0.59%*** (4.57) | 0.14% (0.96) |
| *Adj_ABPROD* | 439 | 400 | Confirmed | 0.52%*** (2.83) | 0.97%*** (4.26) | 0.34%* (1.94) | 0.45%** (2.55) | 0.63%*** (3.39) |
| | 690 | 634 | Downgraded | 0.02% (0.13) | –0.20% (–1.17) | –0.06% (–0.45) | –0.22% (–1.64) | –0.14% (–0.94) |
| *Adj_ABEXP* | 156 | 99 | Confirmed | –2.82%*** (–8.26) | –3.12%*** (–5.17) | –2.66%*** (–7.81) | –0.30% (–0.52) | –0.46% (–0.80) |
| | 262 | 183 | Downgraded | –2.26%*** (–7.58) | –2.82%*** (–8.23) | –2.32%*** (–8.02) | –0.56%** (–2.27) | –0.50%** (–2.03) |
| *Adj_REM1* | 439 | 373 | Confirmed | 0.03% (0.13) | 0.77%** (2.33) | –0.25% (–0.99) | 0.74%** (2.45) | 1.02%*** (3.44) |
| | 690 | 622 | Downgraded | –0.06% (–0.29) | –0.90%*** (–3.93) | –0.62%*** (–3.16) | –0.84%*** (–3.75) | –0.28% (–1.19) |

**Panel B: Median Comparison**

| Firm Actions | Sample Size | N with Data Pre and Post | Credit Rating Outcome | Pre-Credit Watch | During Credit Watch | Post-Credit Watch | Comparison: during versus Pre | Comparison: during versus Post |
|---|---|---|---|---|---|---|---|---|
| **Earnings Management** | | | | | | | | |
| *Adj_ABACC* | 439 | 326 | Confirmed | –0.03% (–1.15) | 0.46%*** (4.31) | –0.15% (–1.38) | 0.52%*** (3.58) | 0.49%*** (3.79) |
| | 690 | 531 | Downgraded | 0.12% (1.38) | –0.13% (–0.83) | 0.06% (–0.66) | –0.10% (–1.21) | –0.13% (–0.72) |
| *Adj_ABCFO* | 439 | 395 | Confirmed | 0.42%*** (4.65) | 0.11% (1.18) | 0.42%*** (5.24) | –0.21%** (–2.17) | –0.25%*** (–2.84) |
| | 690 | 650 | Downgraded | 0.13% (1.53) | 0.56%*** (7.69) | 0.40%*** (5.43) | 0.45%*** (4.64) | 0.11% (0.92) |
| *Adj_ABPROD* | 439 | 400 | Confirmed | –0.09% (–1.02) | 0.17%*** (2.62) | –0.22% (–0.19) | 0.32%*** (3.05) | 0.36%*** (3.43) |
| | 690 | 634 | Downgraded | –0.10% (–1.01) | –0.27%** (–2.29) | –0.28% (–1.37) | –0.09%** (–2.05) | –0.13%** (–2.06) |
| *Adj_ABEXP* | 156 | 99 | Confirmed | –2.81%*** (–6.57) | –2.51%*** (–6.31) | –2.65%*** (–6.30) | –0.03% (–0.45) | –0.14% (–0.09) |
| | 262 | 183 | Downgraded | –2.12%*** (–6.82) | –2.35%*** (–7.51) | –1.88%*** (–7.00) | –0.26%** (–2.05) | –0.07% (–1.28) |
| *Adj_REM1* | 439 | 373 | Confirmed | –0.61% (–1.04) | –0.02% (1.03) | –0.57%** (–1.98) | 0.52%*** (2.61) | 0.70%*** (3.27) |
| | 690 | 622 | Downgraded | –0.36% (–1.51) | –0.97%*** (–5.26) | –0.75%*** (–3.69) | –0.71%*** (–4.09) | –0.33% (–1.55) |

Modified Table 3 shows mean (Panel A) and median (Panel B) values of our key variables across confirmed and downgraded firms. We exclude any watches where a Moody's credit watch is announced before that of S&P. There are 439 confirmed firms and 690 downgraded

firms in our modified sample. However, for a small number of firms, pre- and post-credit watch figures are not available. The above figures are based on firms for which we have all pre- and post-credit watch data. All values are tested for significance against 0. We also report differences in the key variables between (i) the credit watch period and pre-credit watch period; and (ii) the credit watch period and post-credit watch period, with *t*-tests being used for mean values, and Wilcoxon rank-sum tests for median values. The pre- and post-credit watch periods are of equal length to the credit watch period. *t*-statistics and *z*-values are given in parentheses in Panels A and B, respectively. $^{***}$, $^{**}$ and $^{*}$ denote statistical significance at the 1%, 5% and 10% levels, respectively. All variables are defined in Table 2.

## Modified Table 4

| Estimations | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| **Earnings Management** | | | | | |
| *Adj_ABACC* | 3.6477** | | | | |
| | (1.76) | | | | |
| *Adj_ABCFO* | | –7.4871*** | | | |
| | | (–2.91) | | | |
| *Adj_ABPROD* | | | 4.3787** | | |
| | | | (2.33) | | |
| *Adj_ABEXP1* | | | | 0.3415 | |
| | | | | (0.14) | |
| *Adj_REM1* | | | | | 4.0620*** |
| | | | | | (3.03) |
| **Recovery Control** | | | | | |
| *RATING* | –0.1992*** | –0.1970*** | –0.1993*** | –0.2721*** | –0.1966*** |
| | (–6.69) | (–6.51) | (–6.73) | (–4.84) | (–6.57) |
| *LENGTH* | 0.0008 | 0.0007 | 0.0008 | -0.0004 | 0.0007 |
| | (1.59) | (1.48) | (1.61) | (-0.67) | (1.57) |
| *INTCOVER* | 0.0254** | 0.0250** | 0.0277** | 0.0157 | 0.0267** |
| | (2.26) | (2.24) | (2.41) | (1.19) | (2.35) |
| *PPE* | 0.3283 | 0.4552 | 0.5110 | 1.6348** | 0.5727 |
| | (0.91) | (1.26) | (1.39) | (2.17) | (1.56) |
| *SGA* | –2.4075*** | –2.3254*** | –1.7459*** | –0.7896 | –1.7506*** |
| | (–4.13) | (–3.98) | (–2.75) | (–0.78) | (–2.83) |
| *SIZE* | 0.1922*** | 0.1876*** | 0.1860*** | 0.2719*** | 0.1840*** |
| | (3.42) | (3.28) | (3.30) | (2.80) | (3.24) |
| *RECESSION* | –0.5559*** | –0.6007* | –0.5398*** | –0.8536*** | –0.5291*** |
| | (–3.04) | (–1.88) | (–2.96) | (–2.73) | (–2.87) |
| Constant | 1.0103** | 0.9568** | 0.8032* | 0.7770 | 0.7569* |
| | (2.43) | (2.27) | (1.88) | (0.99) | (1.77) |
| Sector dummy | yes | yes | yes | yes | yes |
| N | 1,129 | 1,129 | 1,129 | 418 | 1,129 |
| Pseudo $R^2$ | 0.0798 | 0.0840 | 0.0824 | 0.1144 | 0.0842 |
| **Marginal Effects** | *Adj_ABACC* | *Adj_ABCFO* | *Adj_ABPROD* | *Adj_ABEXP* | *Adj_REM* |
| *% Δ Pr. Recovery for 1 SD increase in variable* | 4.29 | –5.46 | 4.67 | 0.43 | 5.77 |

Modified Table 4 shows coefficients for the following model estimated across the modified sample of 1,129 observations:

*Logit (= 1 Confirmed; = 0 Downgraded) = Constant + β1 Firm Actions + β2 RATING + β3 LENGTH + β4 INTCOVER + β5 PPE + β6 SGA + β7 SIZE + β8 RECESSION + βn* Sector Dummies

To arrive at the modified sample we take all credit watches in the period after Moody's introduced credit watch announcements (the year 1992) and we exclude any S&P credit watch announcement preceded by a Moody's credit watch announcement. There are 439 confirmed firms and 690 downgraded firms in our modified sample. The dependent variable is a dummy indicating the credit watch outcome (1 = confirmed, 0 = downgraded). *Firm Actions* relate to each of the earnings management variables. We control for the initial credit rating, length of the credit watch period and firm characteristics prior to the credit watch and the macroeconomic environment. To control for industry effects, we employ the sectors of the "12 Industry Portfolios" of Fama and French (1993), from which we exclude the financial sector. We calculate White standard errors with firm-level clustering. We present marginal effects of *Firm Actions* by holding other variables at their mean value and calculating the change in the probability of a rating confirmation when the test variable is increased by 1 SD. *z*-values are given in parentheses. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively. All variables are defined in Table 2.

**Supplementary Table 7**
**Trade-off between Accruals-based and Real Earnings Management:**
**Regression Analysis with Alternative Measure of Accruals-based Earnings Management**

| | Panel A: 2SLS | | | | Panel B: OLS | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| **Stage** | ***First*** | ***Second*** | ***First*** | ***Second*** | ***First*** | ***Second*** |
| **Dep Y of Each Stage** | ***AEM*** | ***REM*** | ***REM*** | ***AEM*** | ***REM*** | ***AEM*** |
| *Fitted REM* | | | | 0.1148 | | 0.2575** |
| | | | | (0.90) | | (2.26) |
| *Fitted AEM* | | 2.3335* | | | | |
| | | (1.91) | | | | |
| *Unfitted REM* | | | | | | 0.0760*** |
| | | | | | | (3.36) |
| ***Common Control of AEM*** | | | | | | |
| *LENGTH* | -0.0017** | 0.0045 | 0.0009 | -0.0005 | 0.0009 | -0.0018** |
| | (-2.25) | (1.61) | (0.72) | (-1.47) | (0.72) | (-2.36) |
| *NOA* | -0.0067*** | 0.0046 | -0.0035 | -0.0041 | -0.0035 | -0.0042 |
| | (-2.95) | (0.46) | (-0.48) | (-1.13) | (-0.48) | (-0.93) |
| *OPCYCLE* | 0.0001*** | -0.0004*** | -0.0002*** | 0.0000 | -0.0002*** | 0.0001*** |
| | (3.46) | (-2.74) | (-3.62) | (0.94) | (-3.62) | (3.24) |
| *ROA* | -0.0175 | -0.0536 | -0.0579* | -0.0088 | -0.0579* | 0.0114 |
| | (-0.90) | (-0.99) | (-1.89) | (-0.56) | (-1.89) | (0.46) |
| *SIZE* | -0.0002 | -0.0023 | -0.0013 | -0.0006 | -0.0013 | 0.0014 |
| | (-0.22) | (-0.86) | (-0.49) | (-0.49) | (-0.49) | (0.88) |
| *BM* | -0.0058 | 0.0112 | 0.0048 | -0.0041 | 0.0048 | -0.0030 |
| | (-1.54) | (0.96) | (0.70) | (-1.19) | (0.70) | (-0.71) |
| ***Unique Control of AEM*** | | | | | | |
| *LITIGATION* | -0.0108** | | -0.0245*** | -0.0189** | -0.0245*** | -0.0109** |
| | (-2.02) | | (-2.74) | (-2.28) | (-2.74) | (-2.04) |
| *BIGN* | -0.0021 | | -0.0142 | -0.0025 | -0.0142 | 0.0007 |
| | (-0.32) | | (-1.31) | (-0.43) | (-1.31) | (0.10) |
| *TENURE* | 0.0011 | | 0.0010 | 0.0012 | 0.0010 | 0.0012 |
| | (0.39) | | (0.21) | (0.52) | (0.21) | (0.43) |
| ***Unique Control of REM*** | | | | | | |
| *MSHARE* | -0.0122** | 0.0482** | 0.0200** | | 0.0200** | -0.0169*** |
| | (-2.18) | (2.48) | (2.12) | | (2.12) | (-2.76) |
| *Z* | -0.0016 | 0.0080** | 0.0041** | | 0.0041** | -0.0024* |
| | (-1.63) | (2.47) | (2.35) | | (2.35) | (-1.73) |
| *MTR* | -0.0222 | 0.1055** | 0.0542* | | 0.0542* | -0.0368* |
| | (-1.24) | (2.01) | (1.79) | | (1.79) | (-1.77) |
| Constant | 0.0084 | -0.0079 | -0.0126 | 0.0213 | -0.0126 | -0.0079 |
| | (0.43) | (-0.16) | (-0.37) | (1.25) | (-0.37) | (-0.44) |
| Sector and Year Control | Yes | Yes | Yes | Yes | Yes | Yes |
| $R^2$ | 0.0999 | .0.1315 | 0.1172 | 0.1431 | 0.1172 | 0.1112 |
| N | 870 | 870 | 870 | 870 | 870 | 870 |
| Hausman Test (F) | 7.54 | | 0.22 | | | |
| (p-value) | (0.01) | | (0.64) | | | |
| Weak Instrument Test (Partial | 1.52 | | 6.38 | | | |

| | | |
|---|---|---|
| (p-value) | (0.20) | (0.00) |
| Overidentification Test ($\chi^2$) | 0.30 | 0.11 |
| (p-value) | (0.86) | (0.94) |

In this table, we employ *Adj_ABACC_IDIOSHOCK1* in place of *Adj_ABACC* shown in Panel B of Table 6. All other details of the estimation are unchanged.

# Supplementary Table 8
# Re-estimation of Table 3 and 4 Results: Adjusted Discretionary Current Accruals.

## Panel A: Table 3 with Current Accruals

| Mean Comparison | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Firm Actions** | **Sample Size** | **N with data** | **Credit Rating Outcome** | **Pre-Credit Watch** | **During Credit Watch** | **Post-Credit Watch** | **Comparison: During versus Pre** | **Comparison: During versus Post** |
| **Earnings Management** | | | | | | | | |
| *Adj_ABACC_Current* | 447 | 436 | Confirmed | -0.10% (-1.10) | 0.27%*** (2.99) | -0.20%** (-2.25) | 0.37%*** (2.66) | 0.47%*** (3.58) |
| | 712 | 691 | Downgraded | -0.01% (-0.11) | -0.22%*** (-2.75) | -0.20%** (-2.50) | -0.21%* (-1.82) | -0.02% (-0.13) |
| **Median Comparison** | | | | | | | | |
| **Firm Actions** | **Sample Size** | **N with data** | **Credit Rating Outcome** | **Pre-Credit Watch** | **During Credit Watch** | **Post-Credit Watch** | **Comparison: During versus Pre** | **Comparison: During versus Post** |
| **Earnings Management** | | | | | | | | |
| *Adj_ABACC_Current* | 447 | 436 | Confirmed | -0.09% (-1.22) | 0.16%*** (2.76) | -0.25%*** (-3.45) | 0.25%*** (2.65) | 0.28%*** (3.74) |
| | 712 | 691 | Downgraded | -0.12% (-1.22) | -0.19%** (-2.49) | -0.16%*** (-3.05) | -0.04% (-0.94) | -0.05% (-0.13) |

## Panel B: Table 4 with Current Accruals

| **Earnings Management** | |
|---|---|
| *Adj_ABACC_Current* | 10.7175*** |
| | (3.37) |
| *% Δ Pr. Recovery for 1 SD increase in variable* | 0.0518 |

In this table, we repeat the analyses of Tables 3 and 4 employing current accruals. Current accruals for each firm for each quarter is the change in non-cash current assets less the change in current liabilities plus the change in debt in current liabilities (Δ Compustat 40 - Δ Compustat 36 - Δ Compustat 49 + Δ Compustat 45). We remove *PPEGT* from Equations 7 and 8 and add the trade receivables adjustment of Teoh et al. (1998) and Caton et al. (2011) to Equation 8, given trade receivables are a larger proportion of current accruals. We otherwise follow the method for total accruals to arrive at *Adj_ABACC_Current*, discretionary current accruals of the firm minus the average discretionary current accruals of the industry/ROA/quarter matched portfolio. The sample size is slightly reduced due to the availability of trade receivables data.

Panel A repeats the analysis shown in Table 3 and shows the mean and median value of *Adj_ABACC_Current* across confirmed and downgraded firms. There are 471 confirmed firms and 758 downgraded firms in our sample, however for a small number of firms pre- and post-credit watch figures are not available. The above figures are based on firms for which we have all pre- and post-credit watch data. The values are tested for significance against zero. We also report differences of the key variables between (i) the credit watch period and pre-credit watch period and (ii) the credit watch period and post-credit watch period, with *t*-tests used for mean values and Wilcoxon rank-sum tests for median values. The pre- and post-credit watch periods are of equal length to the credit watch period. *t*-statistics (*z*-values) are reported in parentheses. $^{***, **, *}$ indicate a significance level of 1%, 5% and 10%, respectively. All variables are defined in Table 2.

Panel B presents the coefficient for $\beta 1$ in relation to the following estimation, which repeats the analysis in Table 4:

*Logit (=1 Confirmed; =0 Downgraded) = Constant + β1 Adj_ABACC_Current + β2 RATING + β3 LENGTH + β4 INTCOVER + β5 PPE + β6 SGA + β7 SIZE + β8 RECESSION + βn* Sector Dummies

The dependent variable is a dummy indicating the credit watch outcome (1 = confirmed while 0 = downgraded). *Adj_ABACC_Current* relates to abnormal current accruals, as defined for Panel A. All other variables are as set out for Table 4. We present marginal effects of *Adj_ABACC_Current* by holding other variables at their mean value and calculating the change in the probability of a rating confirmation when this variable is increased by one standard deviation. *z*-values are given in brackets and $^{***, **, *}$ indicate a significance level of 1%, 5% and 10%, respectively. All variables are defined in Table 2.

## Supplementary Table 9
## Re-estimation of Table 4 Results: Last Accounts before Start of Watch to Last Accounts before the End.

| **Estimations** | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| **Earnings Management** | | | | | |
| *Adj_ABACC* | 5.0423** | | | | |
| | (2.32) | | | | |
| *Adj_ABCFO* | | -8.0586*** | | | |
| | | (-2.99) | | | |
| *Adj_ABPROD* | | | 4.7347** | | |
| | | | (2.45) | | |
| *Adj_ABEXP* | | | | 0.8962 | |
| | | | | (0.38) | |
| *Adj_REM1* | | | | | 4.4259*** |
| | | | | | (3.17) |
| **Recovery Control** | | | | | |
| *RATING* | -0.1975*** | -0.1953*** | -0.1998*** | -0.2498*** | -0.1966*** |
| | (-6.86) | (-6.71) | (-6.98) | (-4.81) | (-6.81) |
| *LENGTH* | 0.0007** | 0.0007** | 0.0007** | 0.0002 | 0.0007** |
| | (2.14) | (1.99) | (2.09) | (0.41) | (2.05) |
| *INTCOVER* | 0.0278** | 0.0272** | 0.0300*** | 0.0131 | 0.0288** |
| | (2.45) | (2.41) | (2.61) | (1.05) | (2.51) |
| *PPE* | 0.3934 | 0.4460 | 0.5602 | 1.6088** | 0.5941* |
| | (1.12) | (1.27) | (1.56) | (2.28) | (1.66) |
| *SGA* | -2.4229*** | -2.4195*** | -1.7716*** | -1.2383 | -1.7745*** |
| | (-4.18) | (-4.20) | (-2.79) | (-1.27) | (-2.89) |
| *SIZE* | 0.1881*** | 0.1870*** | 0.1864*** | 0.2484*** | 0.1848*** |
| | (3.41) | (3.34) | (3.37) | (2.67) | (3.32) |
| *RECESSION* | -0.5661*** | -0.5561*** | -0.5637*** | -0.7623*** | -0.5564*** |
| | (-3.31) | (-3.19) | (-3.28) | (-2.69) | (-3.21) |
| *Constant* | 0.9219** | 0.9152** | 0.7266* | 0.6573 | 0.6962* |
| | (2.28) | (2.25) | (1.77) | (0.87) | (1.69) |
| *Sector Dummy* | Yes | Yes | Yes | Yes | Yes |
| *N* | 1229 | 1229 | 1229 | 453 | 1229 |
| *PSEUDO* $R^2$ | 0.0806 | 0.0823 | 0.0816 | 0.1058 | 0.0842 |
| **Marginal Effects** | *Adj_ABACC* | *Adj_ABCFO* | *Adj_ABPROD* | *Adj_ABEXP* | *Adj_REM* |
| % Δ Pr. Recovery for 1 SD increase in variable | 3.69 | -4.46 | 4.66 | 1.06 | 5.58 |

This table presents coefficients for the following model:

*Logit (=1 Confirmed; =0 Downgraded) = Constant + β1 Firm Actions + β2 RATING + β3 LENGTH + β4 INTCOVER + β5 PPE + β6 SGA + β7 SIZE + β8 RECESSION + βn* Sector Dummies

The dependent variable is a dummy indicating the credit watch outcome (1 = confirmed while 0 = downgraded). *Firm Actions* relate to each of the earnings management variables. In this model, we measure *Firm Actions* from the last quarter before the beginning of credit watch to the last quarter before the end of credit watch. As before, we control for the initial credit rating, length of the credit watch period and firm characteristics prior to the credit watch and the macro-economic environment. To control for industry effects, we employ the sectors of the "12 Industry Portfolios" of Fama and French, from which we exclude the financial sector. We calculate White standard errors with firm level clustering. We present marginal effects of *Firm Actions* by holding other variables at their mean value and calculating the change in the probability of a rating confirmation when the test variable is increased by one standard deviation. *z*-values are given in brackets and ***, **, * indicate a significance level of 1%, 5% and 10%, respectively. All variables are defined in Table 2.