The credit relevance of accounting quality measures

Paul Klumpes*

Nottingham Business School
Nottingham Trent University
United Kingdom

and

Anne-lise Ronsse*

EDHEC Business School
24 Avenue Gustave Delory
59011 ROUBAIX

FRANCE

This version 13
6 January 2015

*Contact author details

Nottingham Business School
Nottingham Trent University
Newton Building
Nottingham NG1 4BU
Paul.Klumpes@ntu.ac.uk
Direct: +44 (0) 115 8486512

EDHEC Business School
Anne-lise.ronsse@edhec.edu
Direct:+33(0)3 20 15 48 37

The credit relevance of accounting quality measures

Abstract

The recent financial crisis has highlighted the potential credit relevance of various sources of sustainable earnings quality for complex, large multinational firms. We develop and test a total non-core accruals measure that decomposes the interrelations between core, pension and risk management sources of comprehensive earnings that are not covered in prior literature. Our evidence suggests sustainable earnings quality is related with the credit sensitivity of firms to earnings smoothing and increasing or decreasing earnings management. Empirical tests confirm our prediction that the strength of relation between earnings management and expected rating targets increases (decreases) with their lower (higher) exposure to risk management (pension) activities. The findings suggest that the propensity of firms to exercise managerial discretion over non-core earnings components in order to influence their expected credit ratings, which is costly for investors to monitor.

Keywords: *sustainable earnings; total non-core accruals; expected credit rating; pensions; risk management*

1. Introduction

Credit rating agencies have long recognized the link between earnings capability, cost of capital and firms ratings (Blume et al 1998) while the interrelation between earnings quality and credit ratings is well recognized in prior literature (Dechow et al., 2010). Recently, S&P developed the concept of 'core earnings' to distinguish these influences; Although the relation of street earnings to statutory earning is well known, their relation to non-core versus core earnings components has not been previously examined in the literature. This is becoming a more important issues as time passes since corporate regulators worldwide that the long-term future sustainability of listed corporates is a key objective for good corporate governance. For instance the Financial Reporting Council of the United Kingdom recently updated its corporate governance code which asserted for the first time that provision by companies of information about the risks which affect longer term viability, including the provision of information concerning risk management effectiveness. We coin this information as providing information relevant to "sustainable earnings (i.e. the ability of current earnings to reflect future, long-term earnings (Penman and Zhang, 2006). Since non-core earnings components are often the outcome of the (failure) of management to provide risk management smoothing of current earnings to reflect long-term earnings, we are the first to directly connect the management of non-core earnings to the quality of long-term sustainable earnings.

Unfortunately the existing expected credit ratings literature does not incorporate these insights types of non-core versus core earnings sourced factors in to their prediction of credit rating, despite their likely relevance to complex and large multinational firms.

These are important distinctions given the increasing reliance on risk management by large multinationals to provide assurance regarding their ability to withstand various sources of credit, liquidity and market risks. However the impact of unexpected gains or losses arising from such activities are recorded as forms of other comprehensive income. Additionally, large firms typically retain significant sources of market risk through their exposure to defined benefit pension promises to their employees.

For example Alissa et al (2013) argue and find that management exercises discretion over the earnings management is related to the degree to which firms are under (over) their expected credit ratings. Specifically, they predict and find that firms use income increasing (decreasing) earnings management activities when they are below (above) their expected ratings. They inferred from their results that firms above or below their expected credit ratings may be able to move towards expected earnings through the use of directional earnings management. Jung et al (2013) examine whether firms propensity to engage in earnings smoothing is related to their top or bottom notch of their credit rating. They find that incentives for earning smoothing in order to increase the likelihood of a rating upgrade in the subsequent period. Their results imply that managers use long term financial reporting strategies in order to influence credit risk perceptions.

However there are a number of reasons why these results may not hold; particularly where total comprehensive earnings are derived persistently from core and non-core sources of operations. First, an increasing proportion of earnings are comprised of non-core earnings sources, such as pensions and off balance sheet risk management activities.[1] This may in turn impact the expected credit rating model around which firms

[1] In 2003, the SEC required firms to disclose off balance sheet contractual commitments and obligations. It also issued FIN 46, Consolidation of Variable Interest Entities, effective July 1, 2003. For instance

may seek to influence earnings. Second, the degree to which off balance sheet activities to mitigate these risks may affect the reliability and pertinence of accruals based earnings models currently used to evaluate earnings quality. Since both pensions and risk management activities are important sources of earnings management, the correlation between total comprehensive earnings is positively (negatively) to core earnings sources is correspondingly reduced.

These issues are particularly pertinent given the recent financial crisis and the failure of standard credit rating agencies to predict these in advance. We argue that the propensity to engage in earnings management in order to influence expected credit ratings is closely related to the extent to which firms are exposed to different sources of comprehensive earnings. Unfortunately, current research (e.g. Richardson et al, 2005) fails to either decompose these sources of risk from their analysis of earnings persistence or to recognize the relative independence (covariation) of pension (risk management) activities with core earnings activities.

The purpose of this paper is to investigate these influences on the propensity to influence expected credit ratings through earnings management devices. While prior research has delineated the importance of total versus discretionary accruals (Richardson et al. 2005), such literature does not discriminate among sources of core- versus non-core earnings. In order to clarify these differences, we focus on sources of earnings deriving from other comprehensive income and off balance sheet risk management activities. We therefore develop the concept of non-core total accruals. Sources of non-core earnings have been publicized in the press for their role in the

General Electric in 2004 for the first time consolidated $36.3 billion of assets and $35.8 billion of liabilities in certain sponsored entities and stopped executing new securitization transactions with those entities

financial crisis and in creating “noise” in the ability of credit rating firms to assess the resilience of firms to financial crisis. For example, the financial press has cited the failure of credit rating agencies to detect the importance of various sources of non-core earnings quality in their credit ratings. Following the Enron fiasco and enactment of the Sarbanes Oxley Act and in response to financial press criticism of corporate earnings quality, Standards and Poor’s developed the concept of “core earnings” to delineate the role of pensions and stock options on overall earnings quality. Subsequently, researchers (Picconi, 2006; Coronado and Sharpe, 2003; Coronado et al. 2009) have clarified the importance of pensions earnings from core earnings. However none of these studies incorporated these findings in to a broader delineation to incorporate other non-pension sources of persistence in other comprehensive income that might explain their findings.

Therefore, in order to evaluate the role and importance of credit sensitive activities that may involve employees, credit rating agencies and counterparties of derivative instruments that firms may interact with in order to efficiently undertake these activities. A further justification for our analysis is the impact of tax policy on various sources of earnings quality. Specifically, we delineate core operating and financing activities, which are both taxable and hedged, from non-core pensions activities which are not. This distinction enables us to focus attention on categorizing a new set of accruals that are related to the sources, rather than uses of free cash flow. Since sources of cash flow must equal uses of free cash flow, our new measure complements and extends the prior research on this issue to more comprehensively evaluate how off balance sheet and risk management activities impact on the credit relevance of earnings management activities for complex US firms during the financial crisis. Our insight is based on the observation

that the persistence of earnings components behaves differently whenever the persistence of core earnings significantly deviates from aggregate earnings (Pope and Wang 2005).[2]

We develop and test an expected credit ratings model to examine the credit sensitivity of various earnings components to different sources of core versus financial activities. We apply the model to investigate the incentives facing multinational firms that face complex reasons to manage earnings components in order to manage their expected credit rating. Our empirical framework extends and refines existing evidence on the interrelationship between credit rating and earnings management incentives (e.g. Jung et al., 2013). Specifically, we find that expected credit rating is related to the degree and nature of firms exposure to various sources of pensions and risk management activities that are reflected in SEC regulated accounting estimates but not in GAAP. In particular, we find that the credit model is related to adjusted accruals in ways that are not captured by traditional accounting accruals models. The persistence of performance is related to both credit relevance and to the degree to which disparate sources of risk are incorporated in overall earnings management activities.

The remainder of this paper is organized as follows: Section 2 presents a model for incorporating risk capital and earnings components. Section 3 develops the hypotheses.

[2] Bhojraj and Sengupta (2003), Kraft (2007), Altamuro et al (2009) argue that corporate governance mechanisms can decrease agency risk throughout for example, control of the board or institutional ownership. Kisgen (2007) demonstrates the relation between credit ratings, leverage and equity return volatilities by financial risk variables. Following the nature of the rating change (downgrade), the net debt relative to net equity can be reduced in the firm. Fama and French (2002) Ganguin and Bilardello (2005), Dechow *et al.* (2010) and Poon and Firth (2005) analyze accounting disclosure variables (free cash flow) associated with poorer credit rating and higher spread. Dichev, 1998; Cantor and Packer, 1997; Kisgen, 2007) show that credit rating information have been referred to by different financial variables which evaluate the credit risk of the firm.

Section 4 discusses the sample selection procedure and section 5 describes the data set. Section 6 reports the results of empirical tests. Section 7 provides a conclusion.

2. Model of the quality of core and non-core activities

This section briefly outlines a model of valuation that consolidates the core earnings; pension earnings and risk management activities based on retained and risk capital respectively. We then discuss the implications for the model based on uses of free cash flow; rather than the sources of free cash flow categorization of accruals as identified by Richardson et al. (2005). The Appendix defines the key variables of accruals cited in this study.

2.1 Dual valuation model

An important but often neglected characterization of firm value separates core from non-core earnings sources. We now extend the Landsman et al (2006) framework of valuation components between executive stock options and other elements of firm value, by outlining a firm's market value as comprising a linear combination of book values based on retained capital, and off-balance sheet risk management capital. The latter is assumed to comprise both sources of retained capital such as net pension obligations, and various types of off balance sheet assets and liabilities that firms must disclose to the SEC under Regulation 35.

2.2. Model of Total Accruals

Our delineation of core versus non-core earnings sources is based on the key insight that there are multiple ways to define free cash flows. The standard way to

define free cash flow is in terms of the sources of free cash flows, that is, cash flows from operations less the sum of new short-term debt, investment in working capital and fixed assets. These can be inferred from the analysis of the balance sheet using standard Richardson et al approach to accruals categorization in Richardson et al (2005).

We begin with free cash flows conservation equation, where the sources of cash flows FCF1 equals the uses of cash flows FCF2, or more formally (Penman, 2010):

$$C- I = d + F + p \quad (5)$$

Where C is cash flow from operations and I is cash flow from investments, F is capital repayments and net interest payments and d is net dividends and p is net periodic cash contributions to all employees' deferred compensation plans (e.g.: pension plans, health care plans, endowment trusts and SOE plans).

Where sources of free cash flow equal core operating earnings (COI) less deferred employee compensation expense (p_x) and change in net operating assets (ΔNOA).

$$FCF1 = COI – p_x - \Delta NOA \text{ and}$$

$$FCF2 = NFE - \Delta NFO - \Delta NPO + p + d \quad (2)$$

Where NFE = financial expenses minus financial income, NFO = NOA – CSE and NPO = defined benefit pension obligations less defined benefit pension assets, and p_x is net pension periodic expenses. Assume further that d = OCI + KD where OCI is other comprehensive income and KD is net capital dividends. Then, the cash conservation equation holds:

$$\Delta CSE = (\Delta NOA – NFE – (p_x)) + (OCI + KD) \quad (3)$$

While Richardson et al (2005) focus only on accruals in relation to sources of free cash flow (FCF1), they ignore sources of non-core accruals related to OCI. In particular, since OCI flows have no cash flow equivalents, Richardson et al (2005) understate total

accruals because they assume that all non-cash earnings arise only in relation to the balance sheet and ignore the separation of non-core deferred compensation payments.

We can therefore restate total accruals as those affecting the difference between total comprehensive earnings and free cash flow that impacts both the balance sheet and statement of changes in equity :

$$(COI - p_x - \Delta NOA) = FCF1 = FCF2 = NFE - (\Delta NOA - \Delta CSE) + (OCI - KD) + p \quad (4)$$

Our shareholder equity decomposition is based on the nature of the underlying business activity. We use three broad categories of equity statement activities – non current pension activities affecting pension risk capital, financing activities affecting both debt capital and transferrable risk management capital, and retained equity capital activities. We refer to the corresponding accrual categories as the change in non-cash net employee benefits (ΔNPO), the change in net retained equity capital (ΔCSE) and the change in net risk management capital (ΔRMC), respectively:

$$\text{Total Accruals} = \Delta NPO + \Delta CSE + \Delta RMC \quad (5)$$

where ΔNPO represents the change in pension obligations, net of cash and short-term investments, less the change in pension assets. We generally agree with Picconi's (2006) original argument that considerable subjectivity is involved in the measurement of this accrual category. There are, however, significant differences between the underlying asset and liability components, so we conduct an extended accrual decomposition that further decomposes ΔNPO into its underlying asset (ΔPA) and liability (ΔPL) components:

$$\Delta NPO = \Delta PL - \Delta PA \quad (6)$$

The major underlying assets driving ΔNPO are expected rate of return on pension assets and pension accruals. Both of these categories are measured with relatively low reliability. Expected return on pension assets involve the subjective estimation of future pension investment returns. Moreover, it is commonly used to manipulate earnings through techniques such as trade loading and premature revenue recognition (eg see Li and Klumpes, 2013). The measurement of period pension costs allows for a number of different cost flow assumptions and involves subjective cost allocations. For example prepaid period costs can artificially distort reported income. Inventory accounting also calls for subjective write down decisions based on estimates of fair value.

The major liability driving DPL is the mortality assumption underlying the pension obligations. In contrast to expected return on pension assets and pension accruals, mortality can generally be measured with a high degree of reliability. The only common source of subjectivity that arises for mortality rates is the choice of actuarial mortality assumption table. But since the discount rate assumption can be estimated with reasonable reliability, there is relatively little room for error.

Our second major category of accruals is other comprehensive income, OCI. This category is measured as the change in three major items (besides the pensions already referred to above) that may be considered as dirty surplus accounting (Penman, 2010, 269); unrealized gains and losses on securities available for sale ("AFSGL"), foreign currency translation gains and losses ("FCTGL"), and gains and losses on derivative instruments (hereinafter, "DERGL"). It contains accruals that have generally been ignored in previous research and, like pension related accruals, contain immaterial or no cash counterpart. Nevertheless, this category contains subjective and unreliable

accruals. As with the pension related accruals, we further decompose ΔOCI into the three major dirty surplus components;

$$\Delta OCI = \Delta AFSGL + \Delta FCTGL + \Delta DERGL + \Delta NPO \quad (7)$$

Considerable uncertainty is involved in the estimation of all these accruals. AFSGL includes unrealized gains and losses on securities that management intends to hold, and there is considerable subjectivity involved in the initial decision of the classification of securities that are held to maturity, available for sale and held to maturity. The ΔFCTGL component of ΔOCI is driven by vagaries in the currency differences between US dollars and currencies where firms subsidiaries transact their business. ΔDERGL arises for instruments that involve hedging anticipated future transactions (cash flow hedge) and therefore are difficult to estimate. Finally the ΔNPO component relates to the permanent difference in the rate of growth of liabilities in excess of the rate of growth in pensions assets, respectively.

Finally it should be noted that total accruals as defined in Richardson et al (2005) (TACC) ignores sources of non-core total accruals (NCTACC), which comprises three elements as follows:

$$TACC = CTACC + NCTACC$$

$$NCTACC = \Delta OCI + \Delta NPO + \Delta RM \quad (8)$$

Where ΔOCI is the other comprehensive income items defined in equation 7 above, ΔNPO is the change in total pensions, post retirement benefits and other sources of deferred employee compensation, and ΔRM is total committed cash resources to cover payments in the next five years as per SEC release 35. Since most sources of ΔOCI other than pensions and risk management activities are not persistent over time or

"managed" to permanently affect earnings, we restrict our foregoing analysis only (1) ΔNPO and (2) ΔRM respectively.

Alterantively, Francis et al. (2008) assert that earnings quality is related to the extent of variation in current (operating) earnings against future operating cash flows. As a robustness check, we replicate the Francis et al. accruals measure but adding an additional sustainable earnings component that regresses future five cash flow estimates, as reported by US corporates under SEC Regulation S-K32, against currently reported free cash flows. We label this measure "Klumpes Ronsse 1" (KR1) as opposed to a stock-based measure as identified below.

3. Hypothesis development

Our model of NCTACC implies that pensions and off balance sheet risk management (i.e. non core earnings sources) could systematically and significantly impact on the propensity of firms to engage in earnings management activities in order to influence their expected credit rating. In this section we develop predictions concerning the interaction of earnings management propensity and the sensitivity of the underlying credit-quality of multinational firms to various definitions of (changes in) credit ratings. Specifically, we expect that incentives facing speculative firms to manipulate sources of core versus non-core earnings is significantly greater than that facing investment-grade firms.

Alissa et al (2013) find that firms face incentives to manipulate their expected credit rating through earnings management. We refine and clarify their findings by predicting

that the extent of income increasing (decreasing) earnings management incentives are also related to the sensitivity of the firm to its sustainable earnings quality.

Hypothesis 1: *Ceteris paribus*, the propensity of investment (speculative) grade firms to engage in core income increasing (decreasing) earnings management activities in order to influence their expected credit rating is positively (negatively) related to the extent of their earnings sustainability.

Variations in credit quality between investment grade and speculative grade multinational firms is also likely to impact their propensity to manage non-core earnings. Prior research provides only limited evidence on this issue. For example, Francis et al. (2005) find that credit ratings are positively correlated with accrual quality variables. In effect, low level of rating can reveal a signal of decreased earnings quality of the firm. The diversifiability of information risk, like earnings or tax management, may be negative information management incentives to manipulate their expected credit rating. However prior literature assumes most earnings management is limited to on-balance sheet capital. For instance, Richardson et al (2005) assert that earnings quality is related to the completeness of the earnings management measure. Alissa et al (2013) predict that adjustments made by credit rating agencies to non-core activities are sensitive to the degree of earnings management activities by such firms, but do not consider off-balance sheet risk management or pensions earnings sources. We therefore further condition these posited relations by examining the sensitivity of the accruals

measure to non-core earnings sources, and the overall credit rating of the firm (investment versus speculative grade firms). Specifically we argue that incentives to manage sources of earnings are associated with credit rating quality. We therefore predict that:

Hypothesis 2*: Ceteris paribus*, the propensity of investment (speculative) grade firms to manage sustainable earnings is positively (not) associated with their credit rating.

4. **Sample and data**

4.1.Sample selection

We restrict our sample to those firms for which data was available, and to those S&P 500 large, non-financial firms that have significant sources of both risk management and pensions exposure. However relevant data was not available for these firms under SFAS 158 and SFAS 133 respectively until after 2005. We therefore studied 112 S&P rated, US listed and non-financial issuer from 2005 to 2011, collected from Compustat. We analyzed 652 credit changes during pre-crash (2005-2007), and post-crash (2008-2010) periods. We also partitioned our data between "investment grade" (i.e. AAA to A) and "speculative grade" (A- and below).[3]

The sample is evenly divided between ranges from AAA to BB- ranking, with some downward trend in ratings over time, as defined in table 1, Panel A. Panel B shows that a percentage of firms suffered downgrades than upgrades during the crash period relative to the pre-crash period.

---

[3] Our decision to partition data between investment-grade and speculative-grade subsamples reflects the research objectives of our study and therefore reduce the comparability of our results with the equivalent findings reported in Alissa et al. (2013) and earlier studies.

INSERT TABLE 1 ABOUT HERE

4.2.Data sources

Our empirical results employ data from three sources. Financial statement data are obtained from compustat annual data base and stock return data are obtained from CRSP daily stock returns files. As discussed in section 2.4, our measure of non-core total accruals, NCTACC, is defined in equation 23 as follows: NCTACC = ΔOCI +ΔNPO + ΔFCF where

(i) ΔOCI, the change in the other comprehensive income, is defined as $OCI_t - OCI_{t-1}$. OCI is calculated as the change in net other comprehensive income (other than pensions), and comprises specifically the change in available for sale reserve (ΔAFSGL), the change in the foreign currency translation reserve gains or losses (ΔFCTGL) and changes in the cash flow derivatives reserve (ΔDERGL).

(ii) ΔNPO, the change in the pension and deferred compensation reserves, which is calculated as the sum of defined benefit pension funds per SFAS 158, the change in the post-retirement health care unfunded obligation per SFAS 106 and the change in the stock option expense reserve per SFAS 136. It should be noted that the changes in these reserves is off balance sheet

(iii) ΔFCF, the change in future cash flows, which is based on the SEC release 35 data concerning contingent future cash flows related to financing, off balance sheet leases and future interest payments on debt. It should be noted that this data is not otherwise available in other databases and comprises estimates for the next five years.

We deflate each of these components of non-core earnings by average total assets. The extended balance sheet decomposition further decomposes each of the above accrual components defined above into their respective counterparts. Appendix 1 summarizes the definitions of key concepts that are outlined briefly below.

In order to disentangle core from non-core (pensions and risk management) activities, our accruals measures are defined in terms of the Net operating assets, defined as total assets less current (non-financial) obligations. The first variation to RSST is based on this variation, which we denote as Richardson et al. (2005) accrual measure 1 ("RSST"), i.e.:

$RSST = (\Delta WC+\Delta NCO + \Delta FIN)/ NOA,$

Where $RNOA1 = OI/((NOA_1+NOA_2)/2)$

And $RNFE1 = NFE/((NFO_1+NFO_2)/2)$ (9)

The above measure does not incorporate for pension and stock option expense, and non-pension sources of accruals and non-current balance sheet items. We therefore further adjust equation (9) by separating out net pension (and stock option) accruals, and replacing OI with SPCE (i.e. eliminating pension and stock option expenses) to arrive at an "adjusted RSST" measure as defined below:

$RSSTM = (\Delta WC+\Delta NCO+\Delta FIN-\Delta PEN)/NOA,$

Where $RNOA2 = SPCE/(NOA_1+NOA_2)/2)$

And $RNFE2 = NFE/((NFO_1+NFO_2)/2)-(NPO_1+NPO_2))/2)$ (10)

Assuming that some firms attempt to bypass the standard balance sheet metrics through subtle use of risk management activities (such as negotiating unused credit facilities)

that generate sources of risk capital to supplement on-balance sheet activities, we modify equation 10 to arrive at our new sustainable earnings measure KR2, by further adjusting NOA for off-balance sheet items such as changes in hedged derivative activity (ΔHD) and changes in operating leases (ΔOL). NFO is also affected by changes in unhedged derivatives (ΔUHD) unused credit facilities (ΔUCF),

KR2 = (ΔWC+ΔNCO+ΔFIN-ΔPEN)/(NOA+HD+OL),

Where RNOA3 = (SPCE+ΔOL+ΔHD)/(NOA_1+NOA_2)/2)

And RNFE3 = (NFE+ΔUHD+ΔUCF)/((NFO_1+NFO_2)/2)-(NPO_1+NPO_2))/2) (11)

4.2.Development of expected credit rating proxy

We follow Alissa et al. (2013) procedure to estimate a firm's expected credit rating based on the characteristics that are posited to drive target leverage, including size, profitability, operating risk, asset specialization, future growth options. We therefore estimate a firm's expected credit rating by estimating the following ordered probit model:

$$RATING_{it} = \alpha_j + \boldsymbol{X_{it}}\boldsymbol{B} + u_{it} \quad (12)$$

Where RATING is an ordinal variable taking on values from 1 to 16, representing Standard & Poor's (S&P's) long-term credit rating from B-, the lowest rating possible before a firm approaches serious vulnerabilities regarding repayment of its debts, to AAA, the highest rating possible. $\boldsymbol{X_{it}}$ is a vector of control variables shown in the prior literature to be important determinants of expected credit rating, such as firm size, profitability, operating risk, growth/investment opportunities, asset tangibility, and market valuation.[4]

[4] Following the procedure outlined in Alissa et al. (2013, 133) we proxy for size with the natural log of sales (SIZE). Profitability (PROFIT) is operating income scaled by lagged total assets. Operating risk (OPRISK) is measured as the standard deviation of operating income scaled by lagged total assets,

Table 2 presents the results from estimating Eq. 12 over the sample period, separately for the investment-grade and speculative-grade sub-samples. For the investment grade sub-sample, the results indicate that firms' expected ratings are positively related to the variables discussed above except for *OPRISK,* consistent with prior research. *SIZE, TANG* and *SGA* but only *SIZE* is statistically significant. For the speculative grade sub-sample, *PROFIT, TANG* and *MTB* are significantly negatively associated with expected ratings. By contrast, for the speculative grade sub-sample, *RD,RDIND, MTB* and *PROFIT* are negatively associated with expected ratings. Only *MTB, SIZE* and *PROFIT* are statistically significant.

These findings are inconsistent with those reported by Alissa et al. (2013) and other prior related research and suggests that expected rating for large, complex multinational firms is driven by different behavior of these variables than for both larger samples of firms. They also imply that expected ratings for our sample of speculative firms differs significantly for our sample of large multinational investment-grade firms. Therefore in all of the remaining empirical tests, we report the earnings management incentives separately for these two samples.

INSERT TABLE 2 ABOUT HERE

4.4. Descriptive statistics

measured over the previous five years. We proxy for growth and investment opportunities using research and development expenditures scaled by sales (*RD*) and selling, general and administrative expenses scaled by sales (*SGA*). In addition to including *RD*, we include an R&D indicator (*RDIND*) that equals one if *RD* is not missing and zero otherwise. Asset tangibility (*TANG*) is net property, plant and equipment, scaled by total assets. We proxy for market valuation using market-to-book (*MTB*) calculated as the market value of assets over total assets, where the market value of assets is total assets minus book equity plus market equity. We also include industry fixed effects.

Descriptive statistics for both the accruals measures (Panel A) and our independent variables (Panel B) are reported in table 3, which show the mean standard deviation for both the match-paired investment and speculative grade sub-samples together with paired sample t-tests.

INSERT TABLE 3 ABOUT HERE

Panel A shows that except for the basic RSST measure, there is no significant difference between accruals measures at the 5% level. However KR1 is positive and marginally significant at the 10% level. The KR measures are higher for the investment grade than for the speculative grade, in contrast to the RSST measure. However with the exception of the KR1 measure, the RNOAs are higher for speculative grade than investment grade firms. In addition, risk capital, net financial obligations and risk capital are higher for speculative grade firms. These results are consistent with our expectations.

Panel B shows the descriptive statistics for the independent variables. These are mostly identical to the control variables which Alissa et al. (2013) argue are associated with earnings management. First, we include the standard measures of leverage (*LEV)* and Altman's z score (*ALTZ*) to control for financial distress, as well as the need for external financing (*EXTFIN*), being an indicator variable that equals one if the firms free cash flow is less than -0.1 and zero otherwise. We also include the standard deviation of stock returns over 60 months prior to the end of year t-1 to control for firm stock volatility (RETVOL). Additionally we control for financial performance effects by including book to market ratio (*BTM*) and *RNOA* (whose definitions are defined above). We also control for growth in sales and firm size effects (*GROWTH* and

LNSIZE, respectively). We also include analyst expectations variables, to reflect four consecutive quarters of earnings growth (*EPSGROW*, where one if EPS increases over the prior four quarters and zero otherwise) and exceeding of beating analysts target earnings in the past consecutive eight quarters (*SMALLPOS*). Finally we include corporate governance variables reflecting both management compensation incentives in terms of bonuses and options (*BONUS* and *OPTIONS*), and whether the chief executive officer also chairs the board or not (*CHAIR*, equals one if yes, zero otherwise).

In addition to the above standard variables used in prior research to be associated with earnings management, we also include two further variables associated with sources of retained risk (pension unfunded obligation as a percentage of NOA, *NPNOA*) and transferred risk capital, defined as the total value of unused credit facilities as a percentage of *NOA*, *RCNOA*). We consider these measures are relevant to credit ratings processes because they indicate the extent to which firms choose to retain non-core risks on their balance sheet, and to finance future expected contractual cash flow commitments through off-balance sheet risk management activities.

Table 3, Panel B shows that *BTM, LEV, RETVOL, GROW* are all significantly higher for speculative sub-sample firms at the 5% level, as might be expected. In addition there is a significantly higher proportion of CEOs also acting as chair of the board for these firms. By contrast, *ALTZ, RNOA* and *SIZE* are significantly lower for these firms, also consistent with our expectations. None of the other variables are significantly different.

Table 4 shows the comparative earnings management activities between investment-grade and speculative grade firm sub-samples for the operating-income focused accrual (Panel A) and total accrual (Panel B) measures, respectively.

INSERT TABLE 4 ABOUT HERE

Abnormal accruals of investment grade firms are similar to those of speculative grade firms. However for measures of real activities earnings management, investment grade firms engage in less intensive cash low and production activities, but more discretionary activities, than speculative-grade firms. These results are consistent for both above and blow expected rating firms. For total accruals earnings measures (RSST, KR1 and KR2), above expected rating investment grade firms are significantly higher than speculative grade investment firms. By contrast, for below expected grade firms, the opposite holds. These results imply that the direction of grading has a significant bearing on differences in earnings management discretion between firms credit quality.

5. Regression Results

In this section we test the predictions concerning the credit relevance of the propensity of firms to engage in non-core earnings management. These tests are conducted after controlling for various financial, management incentive and other factors associated with analyst expectations, corporate governance. We also include factors reflecting the extent of non-core risk management activities both retained capital (NPNOA) and off-balance sheet risk capital sources (RCNOA). In all regressions, the earnings management variable is defined as either the standard earnings management metrics (here in after “EM”), or the more comprehensive earnings management RSST and our own variants KR1 and KR2.

5.1. Earnings management determinants

In order test the predictions of hypothesis H1, we follow the OLS regression approach used in Alissa et al. (2012) (equation 3) that relates non-core earnings management propensity with expected credit rating:

$$EM_{it} = B_0 + B_1 DIFF_{it} + \boldsymbol{Z_{it}} \Sigma B_j + \varepsilon \qquad (20)$$

Where EM is either *ABACC, ABCFO,ABPROD, ABISC, RSST, KR1* or *KR2*; *ABACC* are a firm's performance-matched abnormal accruals; *ABCFO, ABPROD* and *ABDISC* are a firm's performance-matched abnormal cash flows from operations, abnormal production costs, and abnormal discretionary expenses, respectively. *RSST, KR1* and *KR2* are as defined in table 1. ***Z*** is a vector of control variables discussed in section 4.3.[5] Consistent with the predictions of Alissa et al. (2013), we expect the sign for our coefficient of interest B1 will vary depending on which EM we test. For standard EM we expect $B_1 < 0$ for *ABACC* and *ABPROD* as well as the generic EM, RSST. For both *ABCFO* and *ABDISC* as well as our new metrics KR1 and KR2, we expect $B_1 > 0$. Table 5 reports the results of equation 3 separately for investment (Panel A) and speculative (Panel B) grade sub-samples.

INSERT TABLE 5 ABOUT HERE

For the investment grade sub-sample, we find statistically significant evidence that firms which deviate from their expected credit ratings exhibit greater performance-matched KR2 sustainable earnings management than at-expected credit rating firms, after controlling for previously documented determinants of accruals based

[5] Our analysis is based on the equivalent eq. 3 reported in Alissa et al. (2013, 140, table 7) except that we do not incorporate the effects of the investment cutoff. This is instead controlled externally through the partitioning of investment-grade versus speculative-grade firm sub-samples as outlined in section 3 above.

management. By contrast, with respect to real earnings management or other measures of total accruals (RSST and KR1), we do not find that firms above or below their expected ratings exhibit lower or higher abnormal (sustainable) earnings. This finding contradicts the earlier results of Alissa et al. (2013), who find that firms below (above) their expected ratings exhibit lower (higher) abnormal CFO, higher (lower) abnormal production costs, and lower higher) abnormal discretionary expenses. Further we find that whereas real earnings management activities are associated with leverage and *ROA*, total accruals management is associated with other factors such as *ALTZ* (RSST), *SMALLPOS* (KR2) and SIZE (RSST and KR2).

These results for the speculative grade sub-sample (Table 5, Panel B) are more equivocal. There is no significant relationship between expected credit ratings and either abnormal, real or total accruals measures. However real earnings management activities are associated with *SIZE* (ABACC and ABPROD) and ROA (ABCFO and ABPROD) whereas sustainable earnings management is associated with SIZE and *NPNOA* (KR2) and *BTM*, *ALTZ*, *ROA*, *SIZE* and *CHAIR* (KR1) . These findings are inconsistent both with Alissa et al. (2013) and with prior research, and suggest that sustainable sources of earnings have greater explanatory power for first that deviate from their expected credit rating.

Overall, our multiple regression results confirm the univariate results that there are significant differences in the strength of relation of earnings management incentives for investment-grade versus speculative-grade firms. Investment grade firms manage their expected credit ratings via off-balance sheet risk management activities (KR2), whereas earnings management for speculative firms is not directly associated with expected

credit rating, but with firm characteristics for core activity management and retained and off-balance sheet capital for non-core activity management (KR1).

5.2. Determinants of Investment Grade

Table 6 reports the results of tests of our prediction hypothesis H2 concerning the strength of association between overall credit rating grade, and various firm characteristics as outlined in the previous section.

INSERT TABLE 6 ABOUT HERE

We find that real earnings management activities related to abnormal accruals are significantly different for investment versus speculative grade firms. In addition, relative to speculative firms, investment grade firms have significantly lower *RETVOL*, *BTM*, *LNSIZE* and *CHAIR*, but higher Z-scores size and external financing needs. These results are consistent across various measures of accounting quality.

Table 7, panels A and B, show the results for tests of the determinants of credit rating level within each of the sub-samples of investment grade (panel A) and speculative grade (Panel B) sub-sample firms, respectively. For investment grade firms (Panel A), there is a negative association between abnormal accruals (ABACC) and ratings level. Consistent with our predictions, ratings levels within the investment grade firms is positively associated with both measures of sustainable earnings management activities (KR 1 and KR2). These results hold even after controlling for various other factors as per the Alissa et al. (2013). Consistent across all measures of accounting quality, there is a significantly negative relationship between ratings level and *RETVOL*, *ALTZ*, *LEV* and *EPSGROW*, and a positive relationship with *ROA*.

INSERT TABLE 7 ABOUT HERE

By contrast, for speculative grade sub-sample firms (Table 7, Panel B), ratings level is only positively associated with abnormal accruals. For all accounting quality variables, there is a negative association between ratings level and *RETVOL*, *ALTZ* (except for *ABACC*) and *LEV*, and a positive association with *ROA*. However net pension exposure is significantly negatively associated with ratings level for the total accruals model KR2.

5.4. Determinants of changes in credit rating level

OLS regression tests of the sensitivity of credit ratings to the effects of the financial crisis are reported in table 8.

INSERT TABLE 8 ABOUT HERE

Our investment grade sub-sample (Table 8, Panel A) results confirm a significantly positive association between total accruals management (RSST) and change in expected credit ratings. All models of total accruals management, even after controlling for other factors, also have significantly higher explanatory power for changes in credit ratings than either abnormal accruals or real activities accruals management models (except for KR1). In all cases, expected credit rating changes are also significantly negatively related to changes in BTM, consistent with our expectations.

By contrast, determinants of changes in expected credit rating over the financial crisis for speculative grade sub-sample firms (Table 8, Panel B) are more equivocal. None of the measures of changes in earnings management quality explains changes in ratings. Instead, changes in expected credit ratings are positively associated with

changes in BTM and negatively associated with changes in *EPSGROW* (except for KR1). By contrast there is a statisticaly positive relation between changes in RNOA and SIZE for KR1 only. This suggests that factors related to sensitivities in managerial discretion factors associated with sustainability earnings are most closely associated with changes in expected credit ratings over the financial crisis period for speculative-grade firms.

5.5. Robustness checks

In order to validate the robustness of our results, we also re-ran empirical tests conducted by Alissa et al. (2013) concerning the earnings management effects on the mean reversion of ratings deviations (p. 141, eq 4). Specifically, Alissa et al. (2013, 141) posit that if firms engage in earnings management with the intent of returning to an expected rating, then the earnings management behavior should enhance the mean revision of DIFF and estimate a modified version of eq. (20) above, where . EM_{ABACC} is equal to *ABACC* if *DIFF <0* and *-1*ABACC* if *DIFF>0*. *ABACC*, abnormal accruals, is the regression residual from a model of *TA* on $\Delta SALES_{it}$, $PPE_{i,t-1}$, $TA_{i,t-1}$ and $ASSETS_{i,t-1}$, adjusted using performance matching (Kothari et al., 2005). EM_{ABCFO} is equal to *ABCFO* if *DIFF > 0* and *-1*ABCFO* if *DIFF<0*. *ABCFO*, abnormal *CFO*, is the regression residual from a model of *CFO* on $SALES_{it}$ and $\Delta SALES_{it}$, and $ASSETS_{i,t-1}$, adjusted for performance matching (Cohen et al., 2011). EM_{ABPROD} is equal to *ABPROD* if *DIFF<0* and *-1*ABPROD* if *DIFF > 0*. *ABPROD*, abnormal production cost, is the regression residual from a model of production costs on $SALES_t$, $\Delta SALES_{it}$, $\Delta SALES_{i,t-1}$ and $ASSETS_{i,t-1}$, adjusted for performance matching (Cohen et al., 2011). EM_{ABDISX} is equal to *ABDISX* if *DIFF >0* and *-1*ABDISX* if *DIFF<0*. *ABDISX*, abnormal discretionary expenses, is the regression residual from a model of discretionary

expenses on $SALES_{t-1}$ and $ASSETS_{i,t-1}$, adjusted for performance matching (Cohen et al., 2011).

Table 9 presents the results from estimating this equation.

INSERT TABLE 9 ABOUT HERE

Consistent with the results reported by Alissa et al. (2013, p. 143, table 8), we find a negative association between DIFF and DIFF for one and two period lags. However we do not find a strong association between any measure of earnings management change and change in DIFF, except for investment grade firms (two period lagged, ABCFO and ABACC) and speculative grade, two period lagged ABDISX). Contrary to the results obtained in Alissa et al. (Table 8, p. 142) we do not find that earnings management magnifies the mean reversion of deviations from expected credit ratings.

We also further replicate the results of Alissa et al. (Table 9, p. 143) by investigating whether changes in ratings are related to fundamental changes in firms' credit risk. They run the regression of change in ratings year to year, with one, two to five year lags (Alissa et al., eq 5, p. 143), where DRATING is the change in RATING from year t to year t+k, *ΔTDEBT* is the change in a firm's ratio of total debt to total assets from year *t-1* to year *t*. *ΔLTDEBT* is the change in a firm's ratio of long-term debt to total assets from year *t-1* to year *t*. *ΔINTCOV* is the change in a firm's ratio of earnings before interest and taxes to interest expense from year *t-1* to year *t*. *ΔROA* is the change in a firm's return on assets (net income divided by average total assets) from year *t-1* to year *t*.[6]

[6] Due to the severe sample constraints of our sample selection criteria, we are only able to replicate this analysis for one and two year lags only.

Table 10 reports the results for both investment-grade (Panel A) and speculative-grade subsamples (Panel B), respectively.

INSERT TABLE 10 ABOUT HERE

Contrary to the equivalent findings reported by Alissa et al. (2013, 144, table 11) we do not find that earnings management by either investment-grade or speculative grade firms exhibit an association between changes in future credit ratings incremental to the effect of firms' deviations from their expected ratings. Therefore, at least for our sample and our study period, we do not find that there is a connection between credit status of firms and their ability to achieve upgrades or downgrades through income increasing or decreasing earnings management activities except for speculative grade with a negative association between DIFF and RATE for one period lag and INTCOV and KR2 respectively with RATE for two periods lags.

We also conducted further tests on the relation of accounting estimates to "trued up" equivalent cash flows three years lagged. We find that, consistent with our predictions, that investment (speculative) grade firms over (under) estimated their future cash flow commitments relative to lagged three year actual cash flows. This supports our conjecture that speculative grade firms view such disclosures as fulfilling a legitimacy rather than a fundamental business purpose.

6. Conclusion

Understanding the sources of sustainable earnings is important in analysts' ability to discriminate between the credit relevance of high quality and low quality earning firms. In this study, we develop and test simple two new sustainable earnings management

models that extend the existing literature on earnings management. In particular we argue that investment grade firms signal their quality from speculative grade firms by engaging non-core risk management activities that impact both their retained and transferred risk capital sources.

Specifically, we predict and find evidence that investment grade firms around the time of the financial crisis face greater incentives to manage non-core sources of earnings. Whereas traditional earnings management quality is associated with financial characteristics, non-core earnings sources are more likely to be associated with analyst expectations; managerial incentives and sources of non-core retained or transferred capital. Our empirical tests support the predictions that for investment grade firms, non-core earnings management is more strongly associated with expected credit ratings, ratings levels and changes in credit rating levels over the period of the financial crisis. By contrast, credit ratings are associated with traditional core-earnings management incentives for speculative grade firms. We also find that errors in the definition of return on net operating assets help explain future net operating asset returns for investment grade firms. Thus the measures we derive have predictive ability that enhances the predictability of such firms.

Our empirical findings are subject to a number of caveats. First our analysis is restricted to a relatively small sample of non-financial S&P 500 matched paired firms that survived the financial crisis and had sufficient size and complexity to be capable of material exposure to both core and non-core earnings management sources. Consequently we are unable to examine standard explanations of earnings management that are typically related to financial distress that may affect non-surviving, smaller firms. Second, the scope of our analysis is constrained by the availability of GAAP and

SEC regulated disclosures concerning pensions and risk management activities. Finally we constrained our analysis to standard metrics for comprehending the difference between core and non-core sources of earnings, and we recognize that these distinctions are arbitrary and controversial.

Subject to these caveats, our findings have a number of important public policy implications. First, our analysis significantly extends and refines existing studies of the credit relevance of earnings management by discriminating among sources of core and non-core earnings. Second, we refine the analysis of prior studies by examining differences in credit ratings within broader classes of investment and speculative grade credit quality. Third, we innovate by developing new metrics for understanding the interrelation of credit ratings and various sources of sustainable earnings. Finally, we contribute to the existing literature by developing inter-relations between cosmetic accounting management and non-cosmetic risk management activities that may or may not be on-balance sheet. Further research is needed to develop and refine these measures to better understand the linkages between corporate risk management strategies, cost of capital and disclosure quality.

References

Adams, R., and H. Mehran. 2003. Is corporate governance different for bank holding companies? *Economics Policy Review*. 9:123-142.

Alissa, W., S. B. Bonsall, K. Koharki and M.W. Penn 2013. Firms' use of accounting discretion to influence their credit ratings Journal of Accounting and Economics 55; 129-147.

Altamuro, J., R. Johnston, S. Pandit, and H. Zhang . 2009. Operating leases and credit assessments. Working Paper.

Bhojraj, S. & Sengupta, P, 2003. Effects of corporate governance on board ratings and yields: The role of institutional investors and outside directors, *Journal of Business,* 76**:** 455-475.

Blume, M.E., F. Lim, and A. Macinlay. 1998. The declining credit quality of US Corporate Debt: myth or reality? *Journal of Finance* 53(4): 1389-1413.

Cantor, and Packer, 1997. Differences of opinion and selection bias in the credit rating industry. *Journal of Banking and Finance*, 21: 1395-1417.

Coronado, J. and S. Sharpe. 2003. Did Pension Accounting Contribute to a Stock Market Bubble? *Brookings Papers on Economic Activity*: 1: 323-359.

Coronado, J. , O.S. Mitchell, S. Sharpe, S. Nesbitt Blake. 2008. Footnotes Arent Enough: The Impact of Pension Accounting on Stock Values. *Journal of Pension Economics and Finance,* 7(3): 257-76.

Dechow, P. et al. 2010. Understanding earnings quality: a review of the proxies, their determinants and their consequences. *Journal of Accounting and Economics*, 50:344-401.

Dechow, P., W. Ge, C.R. Larson and R.G. Sloan. 2010. Predicting material accounting misstatements. Contemporary Accounting Research.

Dichev, I., 1998, Is the Risk of Bankruptcy a Systematic Risk? *Journal of Finance*, 53: 1131-1148.

Fama, Eugene F., and Kenneth R. French, 2002, The equity premium, *The Journal of Finance* 57, 637-659.

Francis, J., R. LaFond, P. Olsson and K. Schipper. 2005. The market pricing of accruals quality.*Journal of Accounting and Economics*, 39: 295-327.

Ganguin, B., Bilardello, J. (2005). *Fundamentals of corporate credit analysis*, McGraw Hill, New York.

Jensen, M. 1986. Agency costs of free cash flow, corporate finance and takeovers *American Economic Review* 76: 323-329.

Jung, B., N. Soderstrom, Y S Yang. 2013. Earnings smoothing activities of firms to manage credit ratings. *Contemporary Accounting Research*. 30(2): 645-676.

Kisgen, D. 2007. The influence of credit ratings on corporate capital structure decisions. *Journal of Applied Corporate Finance*, 19: 65-73.

Kisgen, D. 2009. Do firms target credit ratings or levels? *Journal of Financial and Quantitative Analysis*, 44 (2): 1323-1456.

Kraft, K. et al. 2007. Are credit ratings valuable information? *Applied Financial Economics*, Discussion Paper N°04-07.

Landsman, S. et al. 2006. Landsman W R, Peasnell K V, Pope P F and Yeh S, 2006, 'Which approach to accounting for employee stock options best reflects market pricing?', *Review of Accounting Studies*, 11 (2-3): 203-245.

Li, Y. and P. Klumpes. 2013. Determinants of expected rate of return on pension assets: evidence from the UK *Accounting and Business Research* 43(1): 3-30.

Nayar,N. and M.Rozeff, 1994. Rating, commercial paper, and equity returns. *Journal of Finance*, Vol. 49: 1431-1449.

Penman, S. 2010. *Financial Statement Analysis and Security Valuation*, McGraw-Hill, New York (4th ed).

Penman, S. and Y. Zhang. 2006. *Modeling Sustainable Earnings and P/E Ratios with Financial Statement Analysis*, SSRN 318967.

Pettit, J. 2004. The new world of credit ratings. *Investment Banking*, working paper series.

Picconi, M. 2006. The Perils of Pensions: does Pension accounting Lead Investors and Analysts astray? *The Accounting Review* 81(4): 925-955.

Poon, W. and M. Firth, 2005, Are Unsolicited Credit Ratings Lower? International Evidence From Bank Ratings. Journal of Business Finance and Accounting, 32:1741-1771.

Pope, P. and P. Wang. 2005. Earnings components, accounting conservatism and equity valuation. *Review of Accounting Studies.*

Richardson, S.A., R.G. Sloan, M.T. Soliman and I. Tuna. 2005. Accrual reliability, earnings persistence and stock prices. *Journal of Accounting and Economics*. 39: 437-485.

Roychowdhury, S. 2006. Earnings management through real activities manipulation. *Journal of Accounting and Economics* 42 (3): 335–70.

Appendix

Definition of Key aacruals variables

Variable	Abbreviation	Pred Sign	Calculation
WC accruals	WC_acc_{it}	+	(Δcurrent assets (*4) – Δcash and short term investments (*1)- (ΔDcurrent liabilities(*5) – Δdebt in current liabilities (*5) – Δdebt in current liabilities (* 34) – Δtaxes payable (*71)))/Average total assets
RSST accruals	$Rsst\_acc_{it}$	+	(ΔWC+ΔNCO +ΔFIN)/Average total assets, where WC = (current assets (*4)- cash and short term investments (*1))- (current liabilities (*5) – debt in current liabilities (* 34)); NCO = (Total assets (*6) - current assets (*4) – investments and advances (*32)) – (total liabilities (*32)) – (total liabilities (*181) – current liabilities (*5) – long – term debt (*9) + Debt in current liabilities (*34) + preferred stock (*130)); following Richardson et al. (2005)
Abnormal accruals	ABACC		Following Roychowdbury (2005)
Abnormal cash flow	ABCFO		Following Roychowdbury (2005)
Abnormal production costs	ABPROD		Following Roychowdbury (2005)
Abnormal discretionary expenses	ABDISC		Following Roychowdbury (2005)
Performance-matched discretionary accruals	$\Delta adifatch_{it}$	+	The difference between the modified Jones discretionary accruals for firm i in year t and the modified Jones discretionary accruals for the matched firm in year t; following Kothari et al (2001); each firm year observation is matched with another firm from the same two-digit SIC code and year with the closest return on assets
Mean-adjusted absolute value of DD residuals	$Resid_{it}$	+	The following regression is estimated for each two-digit SIC industry: $\Delta WC=\beta_0+\beta_1*CFO_{t-1}+\beta_2*CFO_t+\beta_3*CFO_{t-1}+\varepsilon$ The mean absolute value of the residual is calculated for each industry and is then subtracted from the absolute value of each firms observed residual

RSST	$RSST_{it}$	+	RSST = (ΔWC+ΔNCO + ΔFIN)/ NOA, where RNOA1 = OI/((NOA_1+NOA_2)/2) and RNFE1 = NFE/((NFO_1+NFO_2)/2)
KR 1	$KR1_{it}$	+	Francis et al. (2008) association of current operating cash flows to past operating earnings plus future managerial cash flow estimates regressed against current free cash flow
KR 2	$KR2_{it}$	+	KR2 = (ΔWC+ΔNCO+ΔFIN-ΔPEN)/(NOA+HD+OL), Where RNOA3 = (SPCE+ΔOL+ΔHD)/(NOA_1+NOA_2)/2 And RNFE3 = (NFE+ΔUHD+ΔUCF)/((NFO_1+NFO_2)/2)-(NPO_1+NPO_2))/2)

Table 1
Distribution of ratings

Panel A : Investment grade sub-sample firms (n = 158)								
Actual rating	Year							Total actual
	2005	2006	2007	2008	2009	2010	Total	
AAA	6	6	5	6	4	4	31	4.7
AA+	0	0	0	0	1	1	2	0.2
AA	7	6	6	5	5	5	34	5.2
AA-	6	6	6	7	7	6	38	5.8
A+	14	16	18	18	19	18	103	15.8
A	17	19	20	21	21	23	121	18.8
A-	19	12	11	13	12	13	80	12.3
Total Investment	69	65	66	70	69	70	409	62.7
Panel : Speculative grade sub-sample firms (n = 158)								
Actual rating	Year							
	2005	2006	2007	2008	2009	2010	Total	Total actual
BBB+	15	19	23	17	18	19	111	17.0
BBB	18	19	12	14	11	11	85	13.0
BBB-	3	2	4	4	8	7	28	4.4
BB+	1	1	1	0	0	0	3	0.5
BB	1	1	2	4	3	1	12	1.8
BB-	0	0	0	1	1	2	4	0.6
< BB-								
Total Speculative	38	42	42	40	41	40	243	37. 3
Grand Total	107	107	108	110	110	110	652	100

This table shows the distribution of actual credit ratings by year. Actual ratings are presented by row and year are presented by column.

Table 2
Expected rating ordered probit model

Variable	Investment grade firms	Speculative grade firms
MTB	0.001 (0.509)	-0.016 (9.931)***
TANG	-0.008 (0.716)	0.012 (0.794)
RD	-0.196 (1.340)	-0.148 (1.362)
RDIND	0.006 (0.621)	-0.004 (0.316)
SGA	0.043 (0.297)	0.011 (0.369)
PROFIT	-0.007 (0.134)	-0.079 (1.587)*
SIZE	-0.022 (3.228)***	-0030 (4.640)***
OPRISK	0.005 (0.168)	0.027 (0.863)
Industry indicators	YES	YES
Observations	300	276
LR χ^2	160.95	1339.93
Model p-value	0.001	0.001
Pseudo-R^2	0.121	0.062

This table follows Alissa et al. (2013, t1, p. 133) and presents a panel estimation of the expected rating ordered probit model across all years in the sample (2005-2011). The dependent variable is *RATING*, the numeric equivalent of a firm's S&P long-term issuer credit rating in year t (i.e., AAA = 16, B- = 1). Explanatory variables include *MTB*, the ratio of a firm's market value of assets to total assets, where the market value of assets is total assets minus book equity plus market equity; *TANG*, the ratio of a firm's net property, plant and equipment to total non-missing *RD* and zero otherwise; *SGA*, the ratio of a firm's selling, general and administrative expenses to sales; *PROFIT*, the ratio of a firm's operating income over lagged total assets; *SIZE*, the natural logarithm of sales; and *OPRISK*, the standard deviation of a firm's operating income scaled by lagged total assets over the previous five fiscal years. Industry fixed effects and yearly fixed effects are included based on Fama and French (1997) industry definitions. All explanatory variables are winsorized at the 1% level.
*Denote statistical significance at the 10% level.
**Denote statistical significance at the 5% level.
***Denote statistical significance at the 1% level.

Table 3
Descriptive statistics

Panel A: Investment grade sub-sample firms (n=329)

Variable	Mean	Median	Standard dev.	25th percentile	75th percentile
RATING	12.230	12.000	1.292	11.000	13.000
DIFF	0.001ou	0.001	0.032	-0.004	0.003
ABACC	0.154	0.164	0.134	0.073	0.251
ABCFO	-0.041	0.006	1.269	-0.043	0.071
ABPROD	-0.291	0.028	5.351	-0.172	0.160
ABDISX	0.381	0.213	1.087	0.043	0.410
RSST	-0.030	0.000	0.274	-0.090	0.070
KR1	0.080	0.191	1.126	0.205	0.529
KR2	0.010	0.000	0.268	-0.020	0.020
MKTCAP	77332.365	49930.518	75619.23	28346.686	101390.888
RETVOL	0.073	0.070	0.024	0.053	0.088
BTM	0.290	0.260	0.152	0.193	0.361
ROA	0.207	0.114	0.449	0.078	0.163
ALTZ	4.507	4.235	2.348	2.866	5.799
LEV	0.278	0.265	0.196	0.139	0.368
GROWTH	0.104	0.098	0.099	0.055	0.150
EXTFIN	0.140	0.000	0.347	0.000	0.000
SIZE	10.218	10.213	0.713	9.673	10.793
EPSGROW	0.574	1.000	0.495	0.000	1.000
SMALLPOS	0.274	0.000	0.447	0.000	1.000
BONUS	0.690	0.000	1.403	0.000	1.125
OPTION	0.068	0.000	0.221	0.000	0.000
CHAIR	0.760	1.000	0.430	1.000	1.000
NPNOA	0.200	0.030	1.784	0.000	0.100
RCNOA	0.090	0.020	1.847	0.000	0.140

Table 3 (continued)
Descriptive statistics

Panel B: Speculative grade sub-sample firms (n=343)

Variable	Mean	Median	Standard dev.	25th percentile	75th percentile
RATING	8.250	9.000	1.796	8.000	9.000
DIFF	0.001	-0.001	0.031	-0.004	0.003
ABACC	0.127	0.148	0.131	0.076	0.251
ABCFO	0.025	-0.007	0.469	0.076	0.148
ABPROD	0.207	0.052	1.326	-0.020	0.052
ABDISX	0.143	0.043	0.641	-0.026	0.215
RSST	0.075	0.000	0.263	-0.072	0.100
KR1	-0.319	0.122	2.067	-0.113	0.713
KR2	0.004	0.000	0.277	-0.019	0.022
MKTCAP	32967.216	24202.185	32603.006	17519.970	36300.124
RETVOL	0.093	0.088	0.041	0.070	0.110
BTM	0.521	0.472	0.339	0.308	0.647
ROA	0.094	0.088	0.041	0.070	0.110
ALTZ	3.311	2.828	2.131	1.839	4.086
LEV	0.301	0.278	0.172	0.193	0.400
GROWTH	0.137	0.106	0.214	0.038	0.101
EXTFIN	0.160	0.000	0.370	0.000	0.000
SIZE	9.897	9.798	0.793	9.367	10.524
EPSGROW	0.510	1.000	0.501	0.000	1.000
SMALLPOS	0.370	0.000	0.483	0.000	1.000
BONUS	0.669	0.000	1.276	0.000	1.125
OPTION	0.074	0.000	0.335	0.000	0.000
CHAIR	0.840	1.000	0.370	1.000	1.000
NPNOA	0.070	0.020	0.424	0.000	0.090
RCNOA	0.180	0.030	1.370	0.000	0.180

This table presents the descriptive statistics of variables used in the analyses and is consistent with that used in Alissa et al. (2013, t3, 137). *RATING* is an ordinal variable taking on values from 1 to 16 representing the firm's S&P long-term credit rating (i.e. AAA = 16, B = 1). *DIFF* is a firm's actual rating minus its expected rating. Firms' expected ratings are the rating level with the highest fitted probability from Eq. (12), adjusted for the overall frequency of each rating in the sample. *ABACC*, abnormal accruals, is the regression residual from a model of *TA* on $\Delta SALES_{it}$, $PPE_{i,t-1}$, $TA_{i,t-1}$ and $ASSETS_{i,t-1}$, adjusted using performance matching (Kothari et al., 2005). *ABCFO*, abnormal *CFO*, is the regression residual from a model of *CFO* on $SALES_{it}$ and $\Delta SALES_{it}$, and $ASSETS_{i,t-1}$, adjusted for performance matching (Cohen et al., 2011). *ABPROD*, abnormal production cost, is the regression residual from a model of production costs on $SALES_t$, $\Delta SALES_{it}$, $\Delta SALES_{i,t-1}$ and $ASSETS_{i,t-1}$, adjusted for performance matching (Cohen et al., 2011). *ABDISX*, abnormal discretionary expenses, is the regression residual from a model of discretionary expenses on $SALES_{t-1}$ and $ASSETS_{i,t-1}$, adjusted for performance matching (Cohen et al., 2011). Similar regressions are also reported for the *RSST*, *KR1* and *KR2* total accruals measures, and are measured similarly to *ABDISX*. *RETVOL* is the standard deviation of stock returns over 60 months prior to the end of year *t-1*. *BTM* is the ratio of the book value of assets to the market value of the total firm. *ROA* is the ratio of net income to total assets. *ALTZ* is Altman's (1968) *Z*-score as developed by Begley et al. (1996), where $ALTZ = 10.4X_1 + 1.0X_2 + 10.6X_3 + 0.3X_4 + 0.17X_5$, where X_1 = working capital/assets, X_2 = retained earnings/assets, X_3 = earnings before interest and taxes/assets, X_4 = market equity/total liabilities, and X_5 = sales/assets. *LEV* is the sum of long- and short-term debt scaled by $ASSETS_t$. *GROWTH* is the percentage change in net sales from year *t-2* to year *t-1*. *EXTFIN* is an indicator variable that equals one if the firm's free cash flow is less than -0.1, and 0 otherwise. *SIZE* is the natural log of net sales. *SIZE* is the natural log of net sales. *EPSGROWTH* is an indicator variable that equals one if the firm reported increases in EPS for the last four quarters and zero otherwise. *SMALLPOS* is an indicator variable taking the value of one if actual earnings exceeds the analyst target by no more than three cents, and zero otherwise. *BONUS* is the ratio of CEO bonus compensation to CEO total compensation. *OPTIONS* is the ratio of CEO Black-Scholes value of option compensation to CEO total compensation. *CHAIR* is a dummy variable with a value of one if the CEO chairs the board in year *t-1*, and 0 otherwise.

Table 4
Earnings management activities around the investment-grade threshold

Panel A: Operational earnings proxies

Partitions	ABACC			ABCFO		
	Investment grade	Speculative grade	Difference	Investment grade	Speculative grade	Difference
DIFF <0	0.151 (21.239)***	0.138 (14.806)***	0.013	-0.021 (3.011)**	-0.005 (3.833)**	0.016
DIFF > 0	0.156 (22.631)***	0.117 (14.545)***	0.029	-0.067 (1.757)*	0.056 (13.122)***	0.123
	ABPROD			ABDISX		
	Investment grade	Speculative grade	Difference	Investment grade	Speculative grade	Difference
DIFF < 0	-0.350 (3.485)**	0.181 (3.744)**	0.531	0.419 (7.761)	0.076 (3.718)**	0.334
DIFF > 0	-0.222 (1.868)*	0.053 (5.139)***	0.275	0.339 (3.888)**	0.050 (18.942)***	0.289

Panel B: Total accruals proxies

Partitions	RSST1			Francis et al.		
	Investment grade	Speculative grade	Difference	Investment grade	Speculative grade	Difference
DIFF <0	0.040 (7.389)***	-0.004 (9.856)***	0.044	-0.864 -6.384**	-1.311 -4.912*	
DIFF > 0	0.070 (11.663)***	0.028 (10.783)***	0.042	-0.492 3.932**	-0.878 4.714**	
	KR1			KR2		
	Investment grade	Speculative grade	Difference	Investment grade	Speculative grade	Difference
DIFF < 0	0.071 -7.680**	-0.518 -6.082		0.050 (6.490)***	-0.007 (5.506)***	0.057
DIFF > 0	0.077 4.865**	-0.121 5.275**		-0.030 (7.826)***	0.015 (6.798)***	0.045

This table follows Alissa et al. (2013, t6, p. 140) and shows the average values of our earnigns management variables for firms below or above their expected rating and either are investment grade or speculative grade sub-sample firms. The investment grade cutoff falls between the BBB- and BB+ rating levels on the S&P scale, where BBB- is the lowest rated investment grade rating and BB+ is the highest rated speculative-grade rating. Firms that straddle the investment –grade cutoff and blow (above) their expected rating have actual ratings below (above) the investment-grade cutoff and expected ratings above (below) the investment-grade cutoff. *DIFF* is a firm's actual rating minus its expected rating. Firms' expected ratings are the rating level with the highest fitted probability from Eq. (12), adjusted for the overall frequency of each rating in the sample. Operational earnings-based earnings management variables include: ABACC,ABCFO, ABPROD, or ABDISX. The three total accruals proxies are *RSST1*, *RSST2*, *KR1* or *KR2*. *ABACC*, abnormal accruals, is the regression residual from a model of *TA* on $\Delta SALES_{it}$, $PPE_{i,t-1}$, $TA_{i,t-1}$ and $ASSETS_{i,t-1}$, adjusted using performance matching (Kothari et al., 2005). *ABCFO*, abnormal *CFO*, is the regression residual from a model of *CFO* on $SALES_{it}$ and $\Delta SALES_{it}$, and $ASSETS_{i,t-1}$, adjusted for performance matching (Cohen et al., 2011). *ABPROD*, abnormal

production cost, is the regression residual from a model of production costs on $SALES_t$, $\Delta SALES_{it}$, $\Delta SALES_{i,t-1}$ and $ASSETS_{i,t-1}$, adjusted for performance matching (Cohen et al., 2011). *ABDISX*, abnormal discretionary expenses, is the regression residual from a model of discretionary expenses on $SALES_{t-1}$ and $ASSETS_{i,t-1}$, adjusted for performance matching (Cohen et al., 2011). Similar regressions are also reported for the *RSST*, *KR1* and *KR2* total accruals measures, and are measured similarly to *ABDISX*. The evidence in this table shows that, consistent with the equivalent results reported by Alissa et al. (2013, t6, p140) that earnings management activities are greater in magnitude for away-from-expected firms that straddle the investment-grade cutoff.

Table 5

Regression tests of earnings management activities for firms deviating from expected credit ratings

Panel A: investment grade sub-sample firms

	Earnings management variable						
Partitions	Operational earnings proxy				Total accruals proxy		
	ABACC	*ABCFO*	*ABPROD*	*ABDISX*	*RSST*	*KR1*	*KR2*
DIFF	-0.099	-1.180	-6.292	-2.568	-0.336	0.323	1.268
	(0.492)	(0.506)	(0.630)	(-1.508)	(0.679)	(0.062)	(2.613)***
RETVOL	0.273	0.452	9.186	-3.598	-0.039	9.284	-0.407
	(0.909)	(0.134)	(0.635)	(1.459)	(0.056)	(1.221)	(0.575)
BTM	-0.151	1.048	3.465	1.259	-0.078	4.158	-0.018
	(3.103)***	(1.888)*	(1.457)	(3.104)***	(0.681)	(3.331)***	(0.156)
ROA	-0.006	0.192	0.510	1.233	-0.016	-0.189	0.040
	(0.373)	(1.099)	(0.682)	(9.680)***	(0.446)	(0.483)	(1.112)
ALTZ	-0.023	0.040	0.245	-0.005	-0.017	0.043	0.001
	(6.729)***	(1.014)	(1.445)	(0.189)	(2.071)**	(0.481)	(0.097)
LEV	0.156	0.940	4.260	0.928	0.052	4.621	0.061
	(3.849)***	(2.020)**	(2.137)**	(2.729)***	(0.535)	(4.406)***	(0.620)
GROWTH	-0.046	-1.089	-2.956	-1.609	0.189	1.719	0.003
	(0.715)	(1.462)	(0.926)	(2.947)***	(1.232)	(1.026)	(0.021)
EXTFIN	-0.007	-0.300	-0.775	-0.230	-0.023	0.454	-0.056
	(0.385)	(-1.421)	(0.857)	(1.494)	(0.528)	(0.947)	(1.262)
SIZE	0.015	-0.211	-0.603	-0.002	-0.042	0.182	-0.043
	(1.588)	(1.905)*	(1.270)	(0.020)	(1.757)*	(0.731)	(1.831)*
EPSGROW	-0.004	-0.184	-0.702	-0.058	-0.052	0.061	-0.047
	(1.440)	(1.202)	(1.070)	(0.521)	(1.629)*	(0.175)	(1.456)
SMALLPOS	0.019	-0.063	-0.902	0.035	0.064	-0.039	-0.087
	(1.337)	(0.374)	(1.258)	(0.282)	(1.836)*	(0.104)	(2.458)**
BONUS	-0.003	0.008	0.045	-0.002	-0.004	0.010	-0.013
	(0.568)	(0.156)	(0.192)	(0.002)	(0.398)	(0.084)	(0.910)
OPTION	0.044	0.199	1.255	0.314	-0.037	-1.056	0.040
	(1.440)	(0.564)	(0.830)	(1.216)	(0.512)	(1.396)	(0.544)
CHAIR	-0.005	0.051	-0.170	-0.027	-0.001	1.533	0.047
	(0.351)	(0.300)	(0.233)	(0.221)	(0.004)	(4.017)***	(1.312)
NPNOA						0.019	-0.001
						(0.184)	(0.108)
RCNOA						-0.016	0.010
						(0.164)	(1.070)
Constant	0.128	1.848	3.683	0.240	0.485	-7.285	0.378
	(1.201)	(1.482)	(0.690)	(0.263)	(1.812)*	(2.601)**	(1.438)
Observations	334	334	334	334	334	334	334
Adjusted R^2	0.350	0.001	0.001	0.294	0.036	0.140	0.071

Table 5 (continued)

Regression tests of earnings management activities for firms deviating from expected credit ratings

Panel B: speculative grade sub-sample firms

Partition	Earnings management variable						
	Operational earnings proxy				Total accruals proxy		
	ABACC	*ABCFO*	*ABPROD*	*ABDISCX*	*RSST*	*KR1*	*KR2*
DIFF	-0.029	-0.203	-0.115	0.009	-0.124	6.322	0.649
	(0.168)	(0.215)	(0.044)	(0.007)	(0.238)	(1.718)*	(1.186)
RETVOL	-0.278	0.206	-0.958	0.742	0.185	-3.072	-0.001
	(2.096)**	(0.265)	(0.450)	(0.754)	(0.459)	(0.719)	(0.003)
BTM	-0.065	-0.028	-0.146	0.043	-0.116	1.274	0.0188
	(3.613)***	(0.284)	(0.541)	(0.359)	(2.102)**	(1.958)**	(0.326)
ROA	-0.002	0.530	1.242	1.055	-0.069	-0.746	-0.035
	(0.090)	(4.368)***	(3.730)***	(6.849)***	(1.027)	(3.227)***	(0.529)
ALTZ	-0.030	-0.016	0.005	-0.010	-0.004	-0.084	0.012
	(8.083)***	(0.767)	(0.091)	(0.388)	(0.390)	(1.536)*	(1.099)
LEV	0.105	0.021	-0.252	0.180	-0.201	1.182	0.133
	(2.680)***	(0.098)	(0.430)	(0.662)	(1.673)*	(1.990)**	(1.088)
GROWTH	0.11	-0.045	-0.384	0.029	-0.043	0.499	0.001
	(0.88)	(0.296)	(0.931)	(0.151)	(0.517)	(0.569)	(0.001)
EXTFIN	-0.025	0.121	0.342	0.102	0.011	0.263	0.022
	(1.769)*	(1.538)	(1.582)	(1.023)	(0.241)	(0.970)	(0.496)
SIZE	0.046	-0.014	0.279	0.079	0.039	0.320	0.049
	(6.492)***	(0.370)	(2.616)***	(1.600)	(1.804)*	(2.230)**	(2.228)**
EPSGROW	-0.019	-0.064	-0.259	-0.050	-0.008	0.063	0.022
	(1.884)*	(1.116)	(1.655)*	(-0.688)	(0.243)	(0.320)	(0.689)
SMALLPOS	-0.002	-0.042	0.049	-0.088	0.011	-0.345	-0.055
	(0.202)	(0.691)	(0.289)	(1.135)	(0.336)	(1.533)	(1.597)
BONUS	-0.005	-0.019	-0.079	0.016	-0.022	0.092	0.037
	(1.149)	(0.813)	(1.227)	(0.528)	(1.709)*	(2.287)**	(2.896)***
OPTION	0.037	-0.017	0.085	0.023	-0.090	-0.339	-0.067
	(2.256)**	(0.190)	(0.344)	(0.204)	(1.810)*	(1.171)	(1.341)
CHAIR	-0.008	0.012	-0.171	0.036	0.059	0.158	-0.016
	(0.567)	(0.162)	(0.827)	(0.375)	(1.385)	(0.704)	(0.368)
NPNOA						-0.025	-0.087
						(0.026)	(2.459)**
RCNOA						0.186	-0.001
						(0.213)	(0.047)
Constant	-0.127	0.232	-1.428	-0.818	-0.242	-2.670	-0.653
	(1.526)	(0.509)	(1.140)	(1.412)	(0.958)	(1.518)	(2.551)**
Observations	326	326	326	326	326	326	326
Adjusted R^2	0.534	0.043	0.082	0.170	0.024	0.167	0.058

This table presents the average parameter estimates obtained from cross-sectional regressions for the years 2005-2011, following Alissa (2013, 142). The dependent variable is one of the four operational earnings management proxies, ABACC,ABCFO, ABPROD, or ABDISX, or one of the three total accruals proxies RSST, KR1 or KR2. *ABACC*, abnormal accruals, is the regression residual from a model of *TA* on $\Delta SALES_{it}$, $PPE_{i,t-1}$, $TA_{i,t-1}$ and $ASSETS_{i,t-1}$, adjusted using performance matching (Kothari et al., 2005). *ABCFO*, abnormal *CFO*, is the regression residual from a model of *CFO* on $SALES_{it}$ and $\Delta SALES_{it}$, and $ASSETS_{i,t-1}$, adjusted for performance matching (Cohen et al., 2011). *ABPROD*, abnormal production cost, is the regression residual from a model of production costs on $SALES_t$, $\Delta SALES_{it}$, $\Delta SALES_{i,t-1}$ and $ASSETS_{i,t-1}$, adjusted for performance matching (Cohen et al., 2011). *ABDISX*, abnormal discretionary expenses, is the regression residual from a model of discretionary expenses on $SALES_{t-1}$ and $ASSETS_{i,t-1}$, adjusted for performance matching (Cohen et al., 2011). Similar regressions are also reported for the *RSST*, *KR1* and *KR2* total accruals measures, and are measured similarly to *ABDISX*. *DIFF* is a firm's actual rating minus its expected rating. Firms' expected ratings are the rating level with the highest fitted probability from Eq. (12), adjusted for the overall frequency of each

rating in the sample. *MKTCAP* is the market capitalization of the company's stock at year *t-1*. *RETVOL* is the standard deviation of stock returns over 60 months prior to the end of year *t-1*. *BTM* is the ratio of the book value of assets to the market value of the total firm. *ROA* is the ratio of net income to total assets. *ALTZ* is Altman's (1968) *Z*-score as developed by Begley et al. (1996), where $ALTZ = 10.4X_1 + 1.0X_2 + 10.6X_3 + 0.3X_4 + 0.17X_5$, where X_1 = working capital/assets, X_2 = retained earnings/assets, X_3 = earnings before interest and taxes/assets, X_4 = market equity/total liabilities, and X_5 = sales/assets. *LEV* is the sum of long- and short-term debt scaled by $ASSETS_t$. *GROWTH* is the percentage change in net sales from year *t-2* to year *t-1*. *EXTFIN* is an indicator variable that equals one if the firm's free cash flow is less than -0.1, and 0 otherwise. *SIZE* is the natural log of net sales. *SIZE* is the natural log of net sales. *EPSGROWTH* is an indicator variable that equals one if the firm reported increases in EPS for the last four quarters and zero otherwise. *SMALLPOS* is an indicator variable taking the value of one if actual earnings exceeds the analyst target by no more than three cents, and zero otherwise. *BONUS* is the ratio of CEO bonus compensation to CEO total compensation. *OPTIONS* is the ratio of CEO Black-Scholes value of option compensation to CEO total compensation. *CHAIR* is a dummy variable with a value of one if the CEO chairs the board in year *t-1*, and 0 otherwise. Overall, consistent with the equivalent findings reported by Alissa et al. (2013, t7, p. 142), Table 7 shows results consistent with firms that are below (above) their expected credit rating managing their earnings upward (downward). T-Statistics are shown in parentheses below coefficient estimates. Standard errors are clustered by firm and year to adjust for time-series and cross-sectional correlation in the model error term (Petersen, 2009).
*Denote statistical significance at the 10% level.
**Denote statistical significance at the 5% level.
***Denote statistical significance at the 1% level.

Table 6

Determinants of ratings quality

This table reports logistic regressions of the association between ratings quality (a dummy variable proxied by investment grade=1, speculative grade otherwise) and various firm financial characteristics as defined by Alissa et al. (2012) Coefficients with p-value in brackets. Year and industry dummies not reported.

Partition	Accounting quality variable						
	ABACC	ABCFO	ABPROD	ABDISCX	RSST	KR1	KR2
Accounting quality*	3.154 (0.002)	-0.007 (0.956)	-0.064 (0.377)	0.214 (0.214)	-0.397 (0.371)	0.013 (0.799)	0.178 (0.640)
RETVOL	-30.429 (0.001)	-30.398 (0.001)	-30.138 (0.001)	-30.210 (0.001)	-28.051 (0.001)	-29.818 (0.001)	-29.745 (0.001)
BTM	-3.959 (0.001)	-4.347 (0.001)	-4.329 (0.001)	-4.351 (0.001)	-4.934 (0.001)	-4.469 (0.001)	-4.396 (0.001)
RNOA	0.578 (0.192)	0.548 (0.238)	0.680 (0.155)	0.153 (0.753)	0.451 (0.311)	0.533 (0.224)	0.504 (0.247)
ALTZ	0.345 (0.001)	0.265 (0.001)	0.264 (0.001)	0.269 (0.001)	0.243 (0.001)	0.266 (0.001)	0.267 (0.001)
LEV	-1.261 (0.104)	-0.729 (0.333)	-0.695 (0.355)	-0.791 (0.293)	-1.178 (0.129)	-0.763 (0.319)	-0.541 (0.479)
GROWTH	-1.007 (0.172)	-1.082 (0.145)	-1.132 (0.128)	-1.014 (0.169)	-0.834 (0.271)	-1.031 (0.163)	-0.952 (0.202)
EXTFIN	0.589 (0.047)	0.581 (0.048)	0.585 (0.048)	0.592 (0.045)	0.534 (0.075)	0.544 (0.063)	0.560 (0.058)
LNSIZE	0.739 (0.001)	0.882 (0.001)	0.869 (0.001)	0.883 (0.001)	0.983 (0.001)	0.858 (0.001)	0.891 (0.001)
EPSGROW	0.238 (0.272)	0.222 (0.306)	0.205 (0.344)	0.260 (0.232)	0.186 (0.398)	0.197 (0.359)	0.168 (0.439)
SMALLPOS	-0.382 (0.100)	-0.342 (0.137)	-0.339 (0.140)	-0.333 (0.149)	-0.331 (0.155)	-0.345 (0.132)	-0.338 (0.147)
BONUS	0.164 (0.073)	0.179 (0.048)	0.177 (0.051)	0.181 (0.046)	0.137 (0.126)	0.170 (0.058)	0.123 (0.243)
OPTION	0.006 (0.986)	0.064 (0.864)	0.067 (0.859)	0.058 (0.877)	0.034 (0.929)	0.065 (0.862)	0.107 (0.775)
CHAIR	-0.544 (0.031)	-0.502 (0.028)	-0.547 (0.029)	-0.554 (0.027)	-0.622 (0.015)	-0.547 (0.029)	-0.557 (0.027)
NPNOA						0.131 (0.459)	0.122 (0.495)
RCNOA						-0.104 (0.324)	-0.103 (0.333)
Constant	-26.986 (0.999)	-27.118 (0.999)	-26.779 (0.999)	-27.184 (0.999)	-28.045 (0.999)	-26.828 (0.001)	-27.267 (0.999)
Observations	648	648	648	648	648	648	648
Gen R^2	0.515	0.496	0.497	0.498	0.519	0.504	0.502

Table 7

Determinants of ratings level

This table reports OLS regressions of the association between ratings (proxied by categorical variables 1 to 13) and various financial characteristics as per Alissa et al. (2012). Coefficients with t-statistics in brackets. Year and industry dummies not reported.

Panel A: Investment grade

Partition	Accounting quality variable						
	ABACC	ABCFO	ABPROD	ABDISCX	RSST	KR1	KR2
Accounting quality*	-1.692 (3.025)***	-0.048 (0.963)	-0.019 (1.623)*	-0.053 (0.760)	-0.078 (0.326)	0.039 (1.697)*	0.566 (2.389)***
DIFF	-1.542 (0.772)	1.205 (0.585)	-1.237 (0.602)	-1.326 (0.640)	-0.581 (0.273)	-1.235 (0.601)	-1.998 (0.975)
RETVOL	-15.275 (5.166)***	-14.792 (4.967)***	-14.592 (4.907)***	-15.058 (5.037)***	-14.850 (4.919)***	-15.383 (5.180)***	-14.663 (4.998)***
BTM	-2.113 (4.344)***	-2.150 (4.391)***	-2.125 (4.361)***	-2.151 (4.373)***	-2.190 (4.411)***	-2.386 (4.838)***	-2.366 (4.916)***
RNOA	0.453 (3.112)***	0.489 (3.240)***	0.490 (3.261)***	0.543 (3.111)***	0.451 (2.963)***	0.479 (3.192)***	0.441 (2.976)***
ALTZ	-0.100 (2.800)***	-0.069 (1.989)**	-0.066 (1.908)*	-0.071 (2.061)**	-0.069 (1.929)**	-0.074 (2.161)***	-0.088 (2.562)**
LEV	-2.257 (5.554)***	-2.238 (5.497)***	-2.199 (5.410)***	-2.241 (5.484)***	-2.372 (5.709)***	-2.494 (6.005)***	-2.509 (6.250)***
GROWTH	-0.389 (0.614)	-0.507 (0.774)	-0.516 (0.790)	-0.533 (0.805)	-0.429 (0.648)	-0.489 (0.749)	-0.325 (0.501)
EXTFIN	-0.128 (0.702)	-0.028 (0.149)	-0.029 (0.159)	-0.024 (0.129)	-0.036 (0.190)	-0.021 (0.111)	0.050 (0.275)
LNSIZE	0.110 (1.179)	0.100 (1.031)	0.099 (1.026)	0.111 (1.146)	0.154 (1.514)	0.110 (1.153)	0.150 (1.539)
EPSGROW	-0.339 (2.518)***	-0.369 (2.682)***	-0.372 (2.714)***	-0.365 (2.652)***	-0.305 (2.172)**	-0.353 (2.583)***	-0.281 (2.058)**
SMALLPOS	-0.110 (0.777)	-0.180 (1.238)	-0.194 (1.332)	-0.163 (1.115)	-0.148 (0.992)	-0.167 (1.144)	-0.173 (1.186)
BONUS	-0.038 (0.791)	-0.007 (0.152)	-0.008 (0.162)	-0.007 (0.146)	-0.012 (0.243)	-0.006 (0.127)	-0.074 (1.259)
OPTION	-0.217 (0.595)	-0.296 (0.788)	-0.291 (0.778)	-0.290 (0.768)	-0.308 (0.812)	-0.259 (0.689)	-0.260 (0.705)
CHAIR	-0.055 (0.380)	0.007 (0.049)	0.011 (0.075)	0.015 (0.099)	-0.028 (0.181)	-0.077 (0.498)	-0.045 (0.305)
NPNOA						-0.047 (1.210)	-0.054 (1.350)
RCNOA						0.021 (0.549)	0.019 (0.501)
Constant	11.494 (11.125)***	11.201 (10.490)***	11.036 (10.231)***	11.149 (10.455)***	10.627 (9.345)***	11.363 (10.624)***	10.912 (10.195)***
Observations	329	329	329	329	329	329	329
Adjusted R^2	0.304	0.271	0.275	0.270	0.269	0.276	0.294

Table 7 (continued)

Determinants of ratings level

Panel B: speculative grade

Partition	Accounting quality variable						
	ABACC	ABCFO	ABPROD	ABDISCX	RSST	KR1	KR2
Accounting quality*	5.888 (6.177)***	-0.209 (1.102)	-0.018 (0.259)	-0.176 (1.177)	0.121 (0.363)	0.093 (1.506)	-0.463 (1.336)
DIFF	-2.064 (0.736)	-2.315 (0.764)	-2.275 (0.749)	2.271 (0.750)	-2.047 (0.696)	-1.569 (0.528)	-1.897 (0.599)
RETVOL	-5.815 (2.673)***	-8.245 (3.319)***	-8.305 (3.336)***	-8.157 (3.282)***	-6.903 (3.046)***	-8.529 (3.502)***	-7.119 (2.874)***
BTM	-0.292 (0.978)	-0.703 (2.237)**	-0.699 (2.222)***	-0.689 (2.194)**	-0.630 (2.015)**	-0.976 (3.059)***	-0.716 (2.255)**
RNOA	0.608 (1.686)*	0.729 (1.816)**	0.641 (1.606)	0.804 (1.917)*	0.624 (1.635)*	0.740 (1.931)**	0.620 (1.605)
ALTZ	-0.097 (1.441)	-0.271 (4.155)***	-0.268 (4.100)***	-0.269 (4.137)***	-0.237 (3.679)***	-0.274 (4.291)***	-0.267 (4.072)***
LEV	-2.147 (3.327)***	-1.520 (2.222)***	-1*.529 (2.230)***	-1.493 (2.181)**	-1.418 (2.082)**	-2.283 (3.293)***	-1.549 (2.186)**
GROWTH	-0.489 (1.091)	-0.408 (0.847)	-0.406 (0.839)	-0.394 (0.818)	-0.270 (0.570)	-0.238 (0.512)	-0.504 (1.007)
EXTFIN	-0.071 (0.304)	-0.176 (0.696)	-0.196 (0.770)	-0.184 (0.727)	-0.231 (0.942)	-0.170 (0.706)	-0.314 (1.226)
LNSIZE	-0.428 (3.462)***	-0.171 (1.371)	-0.163 (1.289)	-0.154 (1.230)	-0.164 (1.330)	-0.106 (0.866)	-0.135 (1.060)
EPSGROW	-0.029 (0.172)	-0.141 (0.772)	-0.133 (0.722)	-0.137 (0.749)	-0.099 (0.556)	-0.173 (0.969)	-0.150 (0.811)
SMALLPOS	0.300 (1.643)	0.287 (1.461)	0.297 (1.509)	0.281 (1.426)	0.294 (1.535)	0.280 (1.491)	0.246 (1.220)
BONUS	0.028 (0.405)	0.004 (0.052)	0.006 (0.086)	0.011 (0.142)	0.006 (0.080)	0.001 (0.002)	0.013 (0.171)
OPTION	0.138 (0.513)	0.340 (1.186)	0.345 (1.201)	0.348 (1.213)	0.290 (1.027)	0.317 (1.042)	0.366 (1.264)
CHAIR	0.196 (0.866)	0.144 (0.594)	0.138 (0.569)	0.148 (0.610)	-0.015 (0.061)	0.197 (0.800)	0.181 (0.723)
NPNOA						-0.275 (1.371)	-0.350 (1.703)*
RCNOA						0.008 (0.134)	0.006 (0.089)
Constant	10.429 (7.658)***	9.890 (6.761)***	10.009 (6.654)***	9.698 (6.611)***	9.622 (6.738)***	9.259 (5.712)***	9.435 (6.306)***
Observations	325	325	325	325	325	325	325
Adjusted R^2	0.236	0.141	0.137	0.141	0.115	0.126	0.141

Table 8
Determinants of change in credit rating level

This table presents logistic regressions that estimate the association between different accounting accrual measures and the probability of change in credit rating between pre-(2005-2007) and post (2008-2010) financial crisis periods. Coefficients with p-values in brackets. Year and industry dummies not reported.

Panel A: investment grade

Partition	Accounting quality variable						
	ABACC	ABCFO	ABPROD	ABDISCX	RSST	KR1	KR2
ΔAccounting quality*	0.103 (0.938)	-0.106 (0.374)	-0.043 (0.339)	0.042 (0.824)	-1.885 (0.023)	0.060 (0.290)	-0.265 (0.675)
ΔDIFF	4.174 (0.402)	3.829 (0.435)	3.761 (0.442)	4.205 (0.393)	4.650 (0.358)	-10.330 (0.263)	4.442 (0.391)
ΔRETVOL	-0.239 (0.974)	-0.434 (0.953)	0.115 (0.988)	-0.065 (0.993)	2.483 (0.743)	4.691 (0.729)	2.767 (0.720)
ΔBTM	-2.669 (0.042)	-2.411 (0.069)	-2.379 (0.070)	-2.711 (0.039)	-3.174 (0.022)	-4.624 (0.183)	-2.683 (0.044)
ΔRNOA	-0.103 (0.793)	-0.063 (0.874)	-0.071 (0.862)	-0.186 (0.742)	-0.131 (0.738)	0.562 (0.512)	0.021 (0.962)
ΔALTZ	-0.104 (0.301)	-0.095 (0.323)	-0.092 (0.341)	-0.106 (0.267)	-0.149 (0.134)	-0.485 (0.116)	-0.148 (0.139)
ΔLEV	0.542 (0.637)	0.853 (0.471)	0.906 (0.439)	0.492 (0.675)	0.450 (0.698)	1.178 (0.666)	0.582 (0.622)
ΔGROWTH	0.072 (0.961)	-0.208 (0.891)	-0.184 (0.961)	0.162 (0.916)	0.404 (0.794)	-0.017 (0.994)	0.265 (0.861)
ΔEXTFIN	-0.177 (0.667)	-0.261 (0.537)	-0.260 (0.535)	-0.164 (0.695)	-0.184 (0.660)	-1.033 (0.082)	-0.112 (0.792)
ΔLNSIZE	0.264 (0.308)	0.231 (0.379)	0.223 (0.395)	0.268 (0.302)	0.221 (0.409)	0.473 (0.393)	0.208 (0.445)
ΔEPSGROW	0.163 (0.611)	0.173 (0.590)	-0.183 (0.571)	-0.166 (0.605)	-0.212 (0.524)	-0.283 (0.604)	-0.273 (0.423)
ΔSMALLPOS	0.150 (0.670)	0.205 (0.568)	0.205 (0.565)	0.143 (0.686)	0.289 (0.426)	-0.317 (0.692)	0.303 (0.415)
ΔBONUS	-0.214 (0.131)	-0.204 (0.150)	-0.202 (0.152)	-0.215 (0.128)	-0.238 (0.109)	0.075 (0.0.680)	-0.216 (0.133)
ΔOPTION	1.393 (0.171)	1.361 (0.176)	1.367 (0.174)	1.388 (0.172)	0.940 (0.356)	-1.258 (0.547)	1.515 (0.151)
ΔCHAIR	-0.591 (0.102)	-0.633 (0.084)	-0.652 (0.077)	-0.583 (0.109)	-0.504 (0.177)	-0.0.006 (0.995)	-0.656 (0.085)
ΔNPNOA						-0.001 (0.993)	-0.261 (0.276)
ΔRCNOA						0.023 (0.890)	0.707 (0.159)
Constant	-0.224 (0.873)	-0.325 (0.817)	-0.297 (0.832)	-0.212 (0.880)	-0.492 (0.734)	-0.828 (0.604)	-0.355 (0.813)
Observations	156	156	156	156	156	156	156
Gen R^2	0.269	0.275	0.282	0.269	0.313	0.202	0.322

Table 8 (continued)

Determinants of changes in credit ratings level

Panel B: speculative grade

Partition	Accounting quality variable						
	ABACC	ABCFO	ABPROD	ABDISCX	RSST	KR1	KR2
ΔAccounting quality*	6.682 (0.139)	-0.948 (0.294)	-0.155 (0.464)	-0.311 (0.507)	-0.207 (0.672)	-0.169 (0.495)	-0.174 (0.725)
ΔDIFF	9.387 (0.092)	9.736 (0.080)	9.778 (0.079)	9.738 (0.080)	9.676 (0.082)	5.234 (0.312)	9.402 (0.094)
ΔRETVOL	-0.647 (0.857)	0.491 (0.890)	0.335 (0.925)	0.296 (0.933)	0.388 (0.914)	-2.474 (0.514)	-0.561 (0.879)
ΔBTM	1.686 (0.036)	1.584 (0.024)	1.535 (0.041)	1.581 (0.039)	1.562 (0.043)	1.708 (0.009)	1.601 (0.036)
ΔRNOA	-0.374 (0.740)	0.506 (0.678)	0.099 (0.935)	0.253 (0.845)	-0.345 (0.766)	2.314 (0.071)	-0.443 (0.706)
ΔALTZ	-0.073 (0.649)	-0.183 (0.232)	-0.168 (0.273)	-0178 (0.250)	-0.154 (0.308)	0.095 (0.575)	-0.143 (0.355)
ΔLEV	1.673 (0.302)	1.974 (0.219)	1.942 (0.223)	1.960 (0.221)	2.012 (0.208)	-0.152 (0.934)	2.081 (0.194)
ΔGROWTH	-0.216 (0.760)	-0.331 (0.644)	-0.310 (0.657)	-0.291 (0.679)	-0.563 (0.050)	-0.716 (0.345)	-0.340 (0.842)
ΔEXTFIN	0.009 (0.980)	0.108 (0.765)	0.078 (0.828)	0.072 (0.840)	0.048 (0.891)	-0.620 (0.110)	0.072 (0.842)
ΔLNSIZE	-0.809 (0.241)	-0.563 (0.411)	-0.535 (0.419)	-0.545 (0.410)	-0.598 (0.361)	-1.503 (0.027)	-0.494 (0.457)
ΔEPSGROW	-0.565 (0.051)	-0.586 (0.040)	-0.576 (0.045)	-0.581 (0.044)	-0.563 (0.050)	0.072 (0.811)	-0.569 (0.049)
ΔSMALLPOS	-0.512 (0.272)	-0.636 (0.168)	-0.603 (0.188)	-0.604 (0.188)	-0.601 (0.194)	0.286 (0.565)	-0.557 (0.229)
ΔBONUS	0.061 (0.718)	0.052 (0.759)	0.050 (0.765)	0.057 (0.733)	0.045 (0.793)	-0.076 (0.587)	0.053 (0.759)
ΔOPTION	0.095 (0.854)	0.109 (0.832)	0.080 (0.877)	0.093 (0.856)	0.039 (0.940)	1.559 (0.132)	0.048 (0.926)
ΔCHAIR	-0.619 (0.450)	-0.395 (0.619)	-0.374 (0.637)	-0.403 (0.612)	-0.377 (0.635)	-0.790 (0.417)	-0.292 (0.716)
ΔNPNOA						-0.059 (0.870)	0.145 (0.637)
ΔRCNOA						-0.128 (0.417)	0.119 (0.448)
Constant	0.136 (0.924)	0.234 (0.868)	0.288 (0.838)	0.247 (0.861)	0.171 (0.904)	0.562 (0.724)	0.111 (0.937)
Observations	156	156	156	156	156	156	156
Gen R^2	0.243	0.239	0.231	0.232	0.228	0.268	0.238

Table 9
Effect of earnings management on mean reversion of actual credit ratings to expected credit ratings

Variable	Investment grade				Speculative grade			
	$\Delta DIFF_{t+1}$		$\Delta DIFF_{t+2}$		$\Delta DIFF_{t+1}$		$\Delta DIFF_{t+2}$	
DIFF	-0.936***	-0.951	-0.953	-1.000	-0.978	-0.987	-1.091	1.180
	(-9.152)	(6.552)***	(-7.219)***	(10.942)***	(17.071)	(16.569)***	(15.221)***	(10.603)***
$DIFF*EM_{ABACC}$	0.007		0.009		-0.014		-0.011	
	(0.424)		(0.460)		(1.203)		(0.985)	
$DIFF*EM_{ABCFO}$	-0.021		0.122		0.007		0.006	
	(0.893)		(4.129)***		(0.449)		(0.538)	
$DIFF*EM_{ABPROD}$	0.003		0.047		-0.006		0.002	
	(0.128)		(1.287)		(1.909)*		(0.471)	
$DIFF*EM_{ABDISX}$	0.001		-0.017		0.004		0.021	
	(0.050)		(-1.546)		(1.293)		(3.672)***	
EM_{ABACC}	0.032		0.147		0.015		0.006	
	(0.874)		(3.790)***		(1.271)		(0.501)	
EM_{ABCFO}	0.012		0.043		0.012		0.008	
	(0.428)		(1.150)		(0.758)		(0.782)	
EM_{ABPROD}	-0.003		-0.017		-0.008		-0.003	
	(0.450)		(-1.616)*		(2.584)		(0.699)	
EM_{ABDISX}	-0.002		0.003		0.003		0.007	
	(0.332)		(0.420)		(0.770)		(1.062)	
$DIFF*EM_{RSST}$		0.001		-0.002		-0.001		0.007
		(0.183)		(0.289)		(0.079)		(0.557)
$DIFF*EM_{KR1}$		0.003		0.008		-0.003		-0.008
		(0.181)		(0.343)		(0.455)		(1.404)
$DIFF*EM_{KR2}$		0.001		0.004		0.001		0.014
		(0.036)		(0.319)		(0.045)		(1.649)*
EM_{RSST}		-0.002		0.004		0.001		-0.001
		(0.121)		(0.175)		(0.021)		(-0.060)
EM_{KR1}		0.001		0.003		-0.007		-0.009
		(0.111)		(0.253)		(1.054)		(1.551)
EM_{KR2}		-0.001		0.009		-0.009		-0.020
		(0.062)		(0.428)		(1.613)*		(2.325)**
Constant	-0.002	0.001	-0.006	-0.007	0.002	0.005	-0.008	-0.007
	(0.385)	(0.081)	(1.129)	(2.775)***	(0.956)	(2.502)**	(3.325)***	(2.755)***
Observations	156	156	133	133	196	196	152	152
Adjusted R^2	0.443	0.285	0.311	0.600	0.667	0.625	0.548	0.580

This table, following the format of Table 8 of Alissa et al. (p. 143), reports the estimated coefficients from an OLS regression with $\Delta DIFF_{t+k}$ as the dependent variable to examine the effects of earnings management on the mean reversion of deviations from a firm's expected credit rating. $\Delta DIFF_{t+k}$ is the difference between $DIFF_{t+k}$ and $DIFF_t$. *DIFF* is a firm's actual rating minus its expected rating. Firms' expected ratings are the rating level with the highest fitted probability from Eq. (14), adjusted for the overall frequency of each rating in the sample. EM_{ABACC} is equal to *ABACC* if *DIFF <0* and *-1*ABACC* if *DIFF>0*. *ABACC*, abnormal accruals, is the regression residual from a model of *TA* on $\Delta SALES_{it}$, $PPE_{i,t-1}$, $TA_{i,t-1}$ and $ASSETS_{i,t-1}$, adjusted using performance matching (Kothari et al., 2005). EM_{ABCFO} is equal to *ABCFO* if *DIFF > 0* and *-1*ABCFO* if *DIFF<0*. *ABCFO*, abnormal *CFO*, is the regression residual from a model of *CFO* on $SALES_{it}$ and $\Delta SALES_{it}$, and $ASSETS_{i,t-1}$, adjusted for performance matching (Cohen et al., 2011). EM_{ABPROD} is equal to *ABPROD* if *DIFF<0* and *-1*ABPROD* if *DIFF > 0*. *ABPROD*, abnormal production cost, is the regression residual from a model of production costs on $SALES_t$, $\Delta SALES_{it}$, $\Delta SALES_{i,t-1}$ and $ASSETS_{i,t-1}$, adjusted for performance matching (Cohen et al., 2011). EM_{ABDISX} is equal to *ABDISX* if *DIFF >0* and *-1*ABDISX* if *DIFF<0*. *ABDISX*, abnormal discretionary expenses, is the regression residual from a model of discretionary expenses on $SALES_{t-1}$ and $ASSETS_{i,t-1}$, adjusted for performance matching (Cohen et al., 2011). Similar regressions are also reported for the *RSST*, *KR1* and *KR2* total accruals measures, and are measured similarly to *ABDISX*. Overall, the results of this table are similar to those reported by Alissa et al. (2013, 143): i.e., that earnings management by firms in year t increases the mean reversion of deviations from a firm's expected rating, consistent with earnings management facilitating achievement of a expected rating. T-Statistics are shown in parentheses below coefficient estimates. Standard errors are clustered by firm and year to adjust for time-series and cross-sectional correlation in the model error term (Petersen, 2009).
*Denote statistical significance at the 10% level.
**Denote statistical significance at the 5% level.
***Denote statistical significance at the 1% level.

Table 10
Regression tests of earnings management effects on future credit rating changes

Panel A: Investment grade sub-sample firms

Variables	Traditional accruals measures				Total accruals measures			
	$\Delta RATE_{t+1}$		$\Delta RATE_{t+2}$		$\Delta RATE_{t+1}$		$\Delta RATE_{t+2}$	
	DIFF > 0	*DIFF < 0*	*DIFF > 0*	*DIFF < 0*	*DIFF >0*	*DIFF <0*	*DIFF >0*	*DIFF < 0*
DIFF	0.023	0.571	-0.784	1.447	-0.446	1.166	-2.054	2.198
	(0.026)	(0.391)	(0.526)	(1.161)	(0.446)	(0.870)	(1.369)	(1.519)
*DIFF** EM_{ABACC}	-1.045	2.057	-2.085	0.174				
	(1.247)	(1.660)*	(1.976)*	(0.586)				
*DIFF** EM_{ABCFO}	0.005	-0.254	1.587	-0.128				
	(0.017)	(0.570)	(0.843)	(0.364)				
*DIFF** EM_{ABPROD}	0.020	0.111	0.095	0.132				
	(0.259)	(0.743)	(0.230)	(1.926)*				
*DIFF** EM_{ABDISX}	-0.643	-0.269	0.506	0.138				
	(1.539)	(0.622)	(0.771)	(0.591)				
EM_{ABACC}	0.496	-0.542	0.241	-0.142				
	(1.704)*	(1.703)*	(0.707)	(1.567)				
EM_{ABCFO}	0.015	0.077	-1.456	-0.198				
	(0.120)	(0.315)	(1.114)	(0.605)				
EM_{ABPROD}	-0.006	-0.027	-0.047	-0.032				
	(0.103)	(0.438)	(0.314)	(1.099)				
EM_{ABDISX}	0.001	-0.003	0.012	0.114				
	(0.026)	(0.053)	(0.054)	(1.526)				
*DIFF** EM_{RSST}					0.764	0.363	0.153	-0.031
					(1.427)	(0.848)	(0.257)	(0.212)
*DIFF** EM_{KR1}					-0.123	-0.204	0.714	-0.005
					(0.943)	(1.060)	(2.362)**	(0.037)
*DIFF** EM_{KR2}					-0.304	0.366	-0.274	-0.258
					(0.962)	(0.294)	(0.298)	(0.978)
EM_{RSST}					-0.526	-0.044	-0.029	-0.029
					(1.144)	(0.187)	(0.054)	(0.279)
EM_{KR1}					0.085	0.132	0.046	-0.035
					(0.856)	(0.825)	(0.408)	(0.345)
EM_{KR2}					0.072	-0.899	0.043	-0.005
					(0.578)	(0.744)	(0.148)	(0.040)
ΔDEBT	-0.010	0.154	-0.041	0.186	0.064	-0.077	-0.319	0.182
	(0.107)	(0.989)	(0.258)	(2.047)**	(0.543)	(0.468)	(1.827)*	(1.836)
ΔLTDEBT	-0.015	-0.086	-0.078	-0.025	-0.116	0.013	0.081	-0.017
	(-0.153)	(-0.955)	(-0.113)	(-0.541)	(1.032)	(0.137)	(0.469)	(0.300)
ΔINTCOV	-0.084	-0.021	-0.139	0.015	-0.099	0.051	-0.091	0.011
	(1.349)	(0.248)	(1.086)	(0.470)	(1.479)	(0.623)	(0.811)	(0.253)
ΔROA	0.028	0.007	-0.038	0.050	-0.010	0.017	0.049	0.058
	(0.520)	(0.145)	(0.437)	(2.141)**	(0.173)	(0.350)	(0.485)	(2.213)**
ΔBETA	-0.197	-0.232	0.206	-0.076	-0.233	-0.114	-0.263	-0.073
	(1.153)	(1.525)	(0.554)	(0.715)	(1.092)	(0.637)	(0.774)	(0.621)
RET	-1.463	3.494	12.405	-1.489	1.107	3.314	5.743	-3.603
	(0.360)	(1.049)	(1.870)*	(0.674)	(0.235)	(1.030)	(1.078)	(1.750)*
ΔNPNOA					-0.020	-0.129	-0.130	0.030
					(0.338)	(0.958)	(0.597)	(0.566)
ΔRCNOA					0.034	0.198	-0.606	0.027
					(0.183)	(1.464)	(1.858)*	(0.869)
Constant	0.033	0.203	0.032	0.208	0.113	0.022	0.022	0.192
	(0.026)	(2.646)***	(0.873)	(0.208)***	(1.865)*	(0.331)	(0.331)	(2.453)***
Observations	158	110	40	114	158	100	40	114
Adjusted R^2	0.068	0.100	0.326	0.160	0.087	0.144	0.395	0.113

Table 10 (continued)
Regression tests of earnings management effects on future credit rating changes

Panel B: Speculative grade sub-sample firms

	Traditional accruals measures				Total accruals measures			
	$\Delta RATE_{t+1}$		$\Delta RATE_{t+2}$		$\Delta RATE_{t+1}$		$\Delta RATE_{t+2}$	
	DIFF > 0	*DIFF < 0*	*DIFF > 0*	*DIFF < 0*	*DIFF >0*	*DIFF <0*	*DIFF >0*	*DIFF < 0*
DIFF	-1.355	0.571	-0.784	1.447	-0.102	-4.932	-2.054	-3.068
	(1.207)	(0.391)	(0.526)	(1.161)	(0.057)	(2.489)***	(1.369)	(1.186)
DIFF EM_{ABACC}*	-0.622	2.051	-2.085	0.174				
	(0.499)	(1.660)*	(1.976)*	(0.586)				
DIFF EM_{ABCFO}*	-0.283	1.004	1.587	-0.128				
	(0.264)	(1.503)	(0.843)	(0.364)				
DIFF EM_{ABPROD}*	-0.391	-0.261	0.095	0.132				
	(1.269)	(1.183)	(0.230)	(1.926)**				
DIFF EM_{ABDISX}*	0.741	-0.826	0.506	0.138				
	(1.125)	(1.509)	(0.771)	(0.591)				
EM_{ABACC}	0.127	0.262	0.241	-0.142				
	(0.250)	(0.983)	(0.707)	(1.587)				
EM_{ABCFO}	-0.462	-0.457	-1.456	-0.198				
	(0.724)	(1.269)	(1.114)	(0.605)				
EM_{ABPROD}	-0.053	0.046	-0.047	-0.032				
	(0.830)	(0.514)	(0.314)	(1.099)				
EM_{ABDISX}	0.022	0.205	0.012	0.114				
	(0.076)	(1.637)	(0.054)	(1.526)				
DIFF EM_{RSST}*			*		-0.697	0.639	0.153	0.625
					(1.164)	(1.124)	(0.257)	(1.645)*
DIFF EM_{KR1}*					0.022	0.207	0.714	-0.071
					(0.129)	(1.052)	(2.362)**	(0.343)
DIFF EM_{KR2}*					-0.207	0.581	-0.274	-0.354
					(0.575)	(1.387)	(0.298)	(0.601)
EM_{RSST}					0.267	-0.677	-0.029	-0.512
					(0.621)	(1.818)*	(0.054)	(2.391)**
EM_{KR1}					0.036	-0.121	0.046	-0.022
					(0.277)	(0.724)	(0.408)	(0.118)
EM_{KR2}					0.233	-0.154	0.043	0.824
					(1.008)	(0.731)	(0.148)	(3.430)***
ΔDEBT	0.005	0.110	-0.041	0.186	-0.083	-0.077	-0.319	0.170
	(0.047)	(0.779)	(0.258)	(2.047)**	(0.709)	(0.468)	(1.827)*	(0.766)
ΔLTDEBT	-0.073	-0.037	-0.078	-0.025	-0.089	0.013	0.081	-0.047
	(-0.590)	(-0.319)	(0.503)	(0.541)	(0.570)	(0.137)	(0.469)	(0.293)
ΔINTCOV	0.158	-0.100	-0.139	0.015	0.079	0.051	-0.091	-0.339
	(1.946)**	(1.391)	(1.086)	(0.470)	(0.851)	(0.623)	(0.811)	(3.207)***
ΔROA	-0.073	0.081	-0.038	0.050	-0.170	0.017	0.049	0.053
	(0.846)	(1.337)	(0.437)	(2.141)**	(1.577)	(0.350)	(0485)	(0.671)
ΔBETA	0069	0.300	0.206	-0.076	0.311	-0.114	-0.263	0.151
	(0.335)	(1.500)	(0.554)	(0.715)	(1.202)	(0.637)	(0.774)	(0.514)
RET	-7.239	5.169	12.405	-1.489	-2.245	3.314	5.743	3.540
	(1.430)	(1.386)	(1.870)*	(0.674)	(0.319)	(1.030)	(1.078)	(0.525)
ΔNPNOA					-0.010	-0.129	-0.130	0.001
					(0.012)	(0.958)	(0.597)	(0.002)
ΔRCNOA					0.001	0.198	-0.606	-0.069
					(0.020)	(1.464)	(1.858)*	(0.564)
Constant	0.277	0.089	0.032	0.208	0.211	0.255	0.316	0.423
	(2.744)***	(1.450)	(0.162)	(3.066)***	(2.507)***	(3.041)***	(2.432)**	(3.557)***
Observations	144	142	40	114	102	94	40	67
Adjusted R^2	0.12	0.119	0.326	0.160	0.125	0.213	0.395	0.494

This table presents the coefficients from the Alissa et al. (2013, t9 p145) OLS model estimation with $\Delta RATE_{t+1} = \Delta RATE_{t+1} - \Delta RATE_{t}$ is a firm's rating in year t. For each dependent variable, we estimate the regression model separately for firms that are above-expected rating (i.e. DIFF >0) and below-expected rating (i.e. DIFF <0). DIFF is a firm's actual rating minus its expected rating. Firm's expected ratings are the rating level as defined in Alissa et al. (2013), i.e., a firm's actual rating minus its expected rating. Firms' expected ratings are the rating level with the highest fittest probability from Eq. (15), adjusted for the overall frequency of each rating in the sample. EM_{ABACC} is equal to *ABACC* if *DIFF <0* and *-1*ABACC* if *DIFF>0*. *ABACC*, abnormal accruals, is the regression residual from a model of *TA* on $\Delta SALES_{it}$, $PPE_{i,t-1}$, $TA_{i,t-1}$ and $ASSETS_{i,t-1}$, adjusted

using performance matching (Kothari et al., 2005). EM_{ABCFO} is equal to *ABCFO* if *DIFF > 0* and *-1*ABCFO* if *DIFF<0*. *ABCFO*, abnormal *CFO*, is the regression residual from a model of *CFO* on $SALES_{it}$ and $\Delta SALES_{it}$, and $ASSETS_{i,t-1}$, adjusted for performance matching (Cohen et al., 2011). EM_{ABPROD} is equal to *ABPROD* if *DIFF<0* and *-1*ABPROD* if *DIFF > 0*. *ABPROD*, abnormal production cost, is the regression residual from a model of production costs on $SALES_t$, $\Delta SALES_{it}$, $\Delta SALES_{i,t-1}$ and $ASSETS_{i,t-1}$, adjusted for performance matching (Cohen et al., 2011). EM_{ABDISX} is equal to *ABDISX* if *DIFF >0* and *-1*ABDISX* if *DIFF<0*. *ABDISX*, abnormal discretionary expenses, is the regression residual from a model of discretionary expenses on $SALES_{t-1}$ and $ASSETS_{i,t-1}$, adjusted for performance matching (Cohen et al., 2011). Similar regressions are also reported for the *RSST*, *KR1* and *KR2* total accruals measures, and are measured similarly to *ABDISX*. *ΔTDEBT* is the change in a firm's ratio of total debt to total assets from year *t-1* to year *t*. *ΔLTDEBT* is the change in a firm's ratio of long-term debt to total assets from year *t-1* to year *t*. *ΔINTCOV* is the change in a firm's ratio of earnings before interest and taxes to interest expense from year *t-1* to year *t*. *ΔROA* is the change in a firm's return on assets (net income divided by average total assets) from year *t-1* to year *t*. *ΔBETA* is the change in a firm's market model beta based on its previous 60 months of stock returns from year *t-1* to year *t*. *RET* is a firm's stock return during the year *t*. t Statistics are shown in parentheses below coefficient estimates. Overall, consistent with the equivalent findings reported by Alissa et al. (2013), the results in this table suggest that upward (downward) earnings management is associated with positive (negative) changes in future credit ratings incremental to the general mean reversion effect of deviating from an expected credit rating. Standard errors are clustered by firm and year to adjust for time-series and cross-sectional correlation in the model error term (Petersen, 2009).

*Denote statistical significance at the 10% level.

**Denote statistical significance at the 5% level.

***Denote statistical significance at the 1% level.