Short-term debt maturity, monitoring and accruals-based earnings management

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ABSTRACT

Most prior studies assume a positive relation between debt and earnings management, consistent with the financial distress theory. However, the empirical evidence for financial distress theory is mixed. Another stream of studies argues that lenders of short-term debt play a monitoring role over management, especially when the firm's creditworthiness is not in doubt. To explore the implications of these arguments on managers' earnings management incentives, we examine a sample of US firms over the period 2003–2006 and find that short-term debt is positively associated with accruals-based earnings management (measured by discretionary accruals), consistent with the financial distress theory. We also find that this relation is significantly weaker for firms that are of higher creditworthiness (i.e. investment grade firms), consistent with monitoring benefits outweighing financial distress reasons for managing earnings.

1. Introduction

Prior research on debt and earnings management generally assumes a detrimental effect for debt (see for example, Klein, 2002; Gupta et al., 2008). The underlying theme is to what extent debt causes insiders to manipulate accruals when the firm's creditworthiness is in doubt. Examples include the use of accruals to avoid breaching covenants in debt contracts (DeFond and Jiambalvo, 1994) and to avoid lender enforcement (Gupta et al., 2008). We term these explanations financial distress theory. However, theory also suggests that debt may have a beneficial effect for financial reporting quality. Myers (1977), for example, suggests that debt's beneficial effects are strongest when debt maturity is short, because the firm is required to approach lenders more often to obtain new loans, which disciplines insiders. Myer's (1977) contention suggests that short-term debt may have a beneficial effect for earnings management, at least when creditworthiness of the firm is not in doubt. This is particularly relevant in practice, when reported earnings are generally regarded as one important factor in debt holders' evaluation of the firm's credit risk. For example, Treacy and Carey (1998) from *The Federal Reserve Board* report findings from interviewing individuals in large US banks that credit risk raters appraise the quality of financial reporting as well as the quality of management such as competency and integrity. The Comptroller's Handbook of 2001 on *Rating Credit Risk* also expresses similar concerns on the borrower's financial condition as well as the quality of management. As a result, more frequent appraisals in light of shorter term maturities are likely to serve also as a monitoring device that is likely to have a positive effect on the quality of financial reporting. In this paper, we examine whether accruals-based earnings management is lower in high creditworthy firms with more short-term debt.

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Our study is motivated primarily by two factors. First, the empirical evidence on the relation between debt and earnings management is mixed; some studies find a positive relation, others find no relation and others, a negative relation. For example, Becker et al. (1998) find a negative relation between a leverage dummy variable and unsigned discretionary accruals which they attribute to financially distressed firms using income-decreasing accruals prior to contract renegotiation. Negative relations between leverage and unsigned discretionary accruals are also reported in Wang (2006) and Frankel et al. (2002), although these papers do not offer a reason. A recent study reporting a positive relation between unsigned discretionary accruals and debt is Klein (2002). Our survey (appendicized) of 43 papers published in 2006–2008 in eight finance and accounting journals, reveals that 18 papers explain accruals based earnings management using ordinary least squares regression. Of these 18 papers, 11 include a debt control variable and five give a directional prediction for its coefficient, all of which are positive.[1] Results show that five of the debt variable coefficients are positive, two are negative and four are insignificant (see Table A1).[2] Only two of these studies consider that debt can have benefits for financial reporting quality. The arguments for a monitoring role of lenders over management seem to have been ignored by most studies. Recently, finance studies have examined the beneficial effects of short-term debt. Datta et al. (2005), for example, argue that monitoring by lenders of short-term debt for firms with low liquidity risk can reduce agency costs, implying higher accounting quality.[3] We posit that the failure to distinguish and model debt maturity structure arising for firms with high and low creditworthiness could contribute to the inconsistent empirical results documented in prior studies.

Second, there continues to be concern about the rampant earnings management in US companies (Levitt, 2007), despite the then chairman of the SEC, Arthur Levitt, proclaiming earnings management as a problem in 1998 (Loomis, 1999, p. 76). Earnings management is potentially detrimental to investors since it could adversely affect their resource allocation and management decisions (Bergstresser and Philippon, 2006). Prior studies that find evidence linking agency costs with variables such as director ownership and earnings management have called for more research on other agency cost variables that could affect earnings management (e.g. Warfield et al., 1995), but the pool of studies is still quite small and as such conclusions from these studies are at best tentative. Some studies examine internal governance mechanisms (Klein, 2002; Cornett et al., 2009), but despite the extensive prior research on the role of debt monitoring, there is no research of which we are aware that has examined the link between the agency-cost-reducing-role of short-term debt and earnings management.[4] Evidence that can shed some light on the benefits of short-term debt in terms of earnings management is thus likely to be of interest to a wide range of market participants.

To examine how the firm's creditworthiness affects the relation between short-term debt and earnings management, we identify a group of investment grade firms (firms rated by S&P as BBB- or above) as firms that are likely to have higher creditworthiness and investigate the difference in the association between short-term debt and accruals-based earnings management, which is measured as Kothari et al.'s (2005) performance-adjusted discretionary accruals. Drawing data for US firms from COMPUSTAT annual data files from 2003 to 2006 with debt at year end, we find a positive relation between short-term debt and the absolute value of discretionary accruals, consistent with financial distress theory for lower creditworthy firms.[5] We also find that this relation is significantly weaker for high creditworthy (investment grade) firms, consistent with the monitoring theory. A beneficial effect of short-term debt on accruals-based earnings management can be explained by more monitoring from lenders (Myers, 1977; Rajan and Winton, 1995), by weaker financial-distress-related incentives to manage earnings in higher creditworthy firms and by stronger governance mechanisms in high creditworthy firms (Ashbaugh-Skaife et al., 2006). We therefore include a battery of controls for firm risk and governance mechanisms and we deal with possible endogeneity by using the method of instrumental variables and two-stage least squares. We acknowledge the alternative explanation that the weaker association between debt and earnings management for firms with higher credit ratings could be due to the lower incentive to manage earnings instead of stronger monitoring by creditors. We conduct additional tests that suggest that our results may not be purely driven by the different incentives of earnings management for firms with different level of creditworthiness. In particular, we use equity-based compensation as a measure of earnings management incentives and find that the effects of debt on earnings management are indeed more negative for investment-grade firms with more equity-based compensation. This result is more in line with our debt monitoring argument than the alternative argument of lower earnings management incentives for investment-grade firms. However, we acknowledge that this test only identifies a setting with low incentives but not directly measures high monitoring, and as such our results should not be interpreted as conclusive evidence to completely rule out this alternative explanation. We leave this for future research.

Our evidence contributes to the finance and accounting literature by showing that there could be benefits for accounting quality from lenders' monitoring. Researchers have consistently documented the benefits from monitoring by internal

[1] We search the *Web of Science* database for the terms "earnings management" and "earnings quality" in the paper title from 2006 through 2008 in the following journals: *Contemporary Accounting Research*, *Journal of Accounting and Economics*, *Journal of Accounting Research*, *Journal of Banking and Finance*, *Journal of Corporate Finance*, *Journal of Financial Economics*, *Review of Accounting Studies* and *The Accounting Review*. The search produces 43 different papers. Descriptive statistics for the papers estimating accruals models to test for earnings management are available from the authors on request.

[2] One of the four positive coefficients was correctly predicted by the authors.

[3] In this paper we use creditworthiness and liquidity risk interchangeably.

[4] Ahn and Choi (2009) and Ghosh and Moon (2010) examine lender monitoring and earnings management but Ahn and Choi (2009) examine various terms of bank loan contracts and Ghosh and Moon (2010) examine total debt levels.

[5] Three years is used as the cutoff for short-term debt by finance studies examining short versus long-term debt (see for example, Barclay and Smith, 1995; Datta et al., 2005). We find that the results for debt maturing within 5 years to be significant and negative but generally weaker (see also Datta et al., 2005 who also find similar results).

governance structures. The literature is less developed on the benefits of debt monitoring to users of financial reporting. The literature generally assumes that debt is positively related to accruals-based earnings management. By showing that debt maturity structure also matters for earnings management, our paper highlights a possible cause for the inconsistency in results documented by prior studies. The second contribution is that this paper complements Gul and Goodwin (2010) who show that more short-term debt is associated with lower audit fees, and that this relation is weaker for firms with higher quality credit ratings. Our results suggest that the reason for the higher audit fees for firms with less short-term-debt structures could be the more accruals-based earnings management or the potential for it. Finally, this paper contributes to the finance literature by providing evidence consistent with the monitoring role of short-term debt (Datta et al., 2005). While these prior studies suggest that short-term debt structures are likely to provide monitoring benefits, there is little or no empirical evidence on the consequences of these claimed benefits especially for short-term debt structures. This paper provides evidence of the monitoring benefits of short-term debt in terms of constraining accruals-based earnings management behavior.

The next section presents the theoretical background and hypotheses, and this is followed in Section 3 by a discussion of the research design. Section 4 presents and discusses the results and Section 5 concludes.

2. Background and hypotheses development

2.1. Earnings management

A large body of evidence shows that managers manipulate earnings for a variety of reasons (see, for example, Healy and Wahlen, 1999; Park and Shin, 2004; Chou et al., 2006). Both practitioners and policy makers are concerned about earnings management because of the attendant problem of information asymmetry and the potential that shareholders' wealth can be reduced (Teoh et al., 1998a, 1998b; Levitt, 2007).

Managers have two main ways to managing earnings. They can either engage in real earnings management by altering the level and/or the nature of economic activities (such as research and development, training, and advertising) to achieve income targets (Roychowdhury, 2006) and/or they can engage in accrual-based earnings management by choosing accounting policies and estimating accruals (Healy, 1985; DeFond and Jiambalvo, 1994; Teoh et al., 1998a, 1998b). In this paper, we focus on the link between short-term debt and performance-unrelated accrual-based earnings management because financial distress theory is typically benchmarked against accruals-based earnings management.

Prior research suggests that, in general, firms with higher agency costs are associated with higher earnings management (Crutchley and Hansen, 1989; Bathala et al., 1994; Leuz et al., 2003). Warfield et al. (1995), show that firms with lower levels of management ownership (a proxy for higher agency costs) are associated with higher levels of earnings management measured by discretionary accruals. Other governance mechanisms are also effective in constraining earnings management. For example, Dechow et al. (1996), Beasley (1996), Peasnell et al. (2005) and Klein (2002) examine the percentage of independent directors. Independent-minded audit committee members exert influence in choosing the external auditor and in demanding higher quality of financial statements (Carcello et al., 2002; Bliss et al., 2008). Carcello et al. (2002) show that directors' independence, expertise and the frequency of interaction are associated with higher quality earnings. While all of these studies focus on internal governance measures, we focus on an un-researched external governance measure, namely short-term debt maturity, which proxy for the extent of monitoring by lenders (Myers, 1977; Rajan and Winton, 1995).

2.2. Debt and earnings management

Much of the earnings management literature predicts a positive relation between debt and the incentive to manage earnings using accruals because of a firm's closeness to restrictive covenants (see for example, DeFond and Jiambalvo, 1994; DeAngelo et al., 1994; Jaggi and Lee, 2002, among others). Among others, Dichev and Skinner (2002) and Begley and Freedman (2004) question the usefulness of debt as a proxy for the incentives to manage earnings in the presence of covenants because covenant use has declined and the form of covenants has shifted away from accrual-based measures toward cash-flow-based measures. Consequently, some authors argue that debt proxies for other financial-distress reasons, such as bad-news deferral, in predicting a detrimental effect for debt on earnings management (see for example Sercu et al., 2006; Gupta et al., 2008). As noted, we use financial-distress theory to describe all of these explanations.

In a cross-country study, Gupta et al. (2008) argue for a positive relation between short-term debt and earnings management because borrowers are attempting to "circumvent lender enforcement" (Gupta et al., 2008, p. 619). Consistent with financial distress theory, they argue that firms with bad news are more likely to conceal that news using accruals, when the firm has more short-term debt. They further argue that this relation is stronger in countries with weak legal regimes, because it is more costly for lenders to enforce their contracts in those regimes. Gupta et al.'s (2008) study does not consider the firm's creditworthiness, and implicitly assumes that short-term debt increases earnings management for the average firm. However, earnings management caused by concealing bad news is, arguably, a weak motivation for earnings

management in high creditworthy firms.[6] In contrast to Gupta et al., 2008, our study identifies high creditworthy firms as having less earnings management, *within* a country.

Perhaps the most closely related studies are Ahn and Choi (2009) and Ghosh and Moon (2010), because they use only US data. Ahn and Choi (2009) report less earnings management (measured by signed-discretionary accruals from the modified Jones (1991) model), for a sample of "financially healthy" firms with loans from banks: when the number of years passed since loan activation is longer, when the lead bank has a better reputation, and when the magnitude of the loan is larger. They argue that bank monitoring is the cause of these relations. Ghosh and Moon (2010) find that total debt is negatively associated with accruals-based earnings management for a sample of low creditworthy (unrated) firms, but that very high levels of debt are associated with more discretionary accruals. They argue that lender monitoring is the likely explanation for the negative relation and financial distress incentives to manage earnings outweigh lender monitoring when debt is very high.

Our study differs from these two studies in three main ways. First, neither of these studies examines *time to maturity*. While Ahn and Choi (2009) examine the length of a bank loan, their variable is measured as the "number of years since loan activation", and the time to maturity from the firm's reporting date is unknown using this measure. For example, a 10-year loan issued 5 years before the firm's current year would have a value of 5 years, and an 8-year loan issued 5 years before the current year would also have a value of 5 years, using Ahn and Choi's (2009) measure. By contrast in our study, the values would be 5 and 3 years respectively. This distinction is important because the time-to-maturity from reporting date is consistent with the theoretical arguments of Myers (1977) for the agency-cost reducing role of short-term debt. Thus, it is not clear that the negative relation between loan length and unsigned discretionary accruals as documented by Ahn and Choi's (2009) is associated with benefits from short-maturity debt. Second, our study examines how the costs and benefits for financial reporting quality of short-term debt vary with creditworthiness of the firm. Finally, we explicitly control for governance mechanisms, a potentially important correlated omitted variable in these types of study. As noted, Ashbaugh-Skaife et al. (2006) report that a firm's governance quality varies positively with its creditworthiness and creditworthiness and debt levels and maturities are correlated (see Flannery, 1986; Diamond, 1991). For example, firms with extreme levels of debt may also have weak governance mechanisms which can affect the incentives to manage earnings through accruals.

2.3. Development of hypotheses

Little distinction is made in the earnings-management literature between short- and long-term debt, although the financial-distress theory can extrapolate to short-term debt. Short-term debt increases a firm's liquidity risk (and makes the firm less creditworthy), because cash-flows are required sooner to pay off that debt (Johnson, 2003). A positive relation between short-term debt and earnings management is expected using this theory. Gupta et al. (2008) report a positive coefficient for short-term debt in their cross-country earnings management study. Consistent with Gupta et al. (2008) we also predict a positive coefficient for short-term debt and accruals-based earnings management for the average firm.

All lenders monitor their borrowers, but the monitoring advantage of short-term debt vis-a-vis long-term debt, is the greater potential for withdrawal of funds, and for incurring of higher renegotiation costs if insiders shirk (Rey and Stiglitz, 1993), because short-term debt comes up for renewal more frequently than does long-term debt (Rajan and Winton, 1995; Stulz, 2000). Myers' (1977) recommends shortening the maturity of debt to alleviate the "underinvestment" problem. When managers have favorable private information, they are expected to avoid locking in debt financing with long-maturity debt and choose short-maturity debt with the associated lower agency cost (Diamond, 1991). The monitoring role of short-term debt has also been highlighted by Datta et al. (2005) who argue that in the absence of goal alignment between managers and shareholders, more self-interested managers prefer long-maturity debt (Datta et al., 2005, p. 2333). Managers who choose short-term debt are subjecting themselves and their firms to more monitoring than those who choose long-term debt. Datta et al. (2005) show that managers with more share ownership in their firms use more short-term debt, which, they argue is consistent with managers willingly subjecting themselves and their firms to more monitoring. Firms that choose short-term debt are more likely to be associated with lower agency costs and, as a result, these firms are less likely to engage in earnings management. Gul and Goodwin (2010) show that investment grade firms with more short-term debt have lower audit fees which they argue is consistent with lenders' monitoring reducing the risk of financial misreporting, with a consequent reduction in fees.

If high and low creditworthy firms benefit from monitoring then both groups of firms should have lower accruals-based earnings management *ceteris paribus*. But for high creditworthy firms, the financial-distress-related incentives to manage earnings are comparatively weaker. We assume that managers are aware of increased monitoring from lenders of short-term debt and that this monitoring is homogenous across firms for a given level of short-term debt. Thus, we argue that, for high creditworthy firms, the incentive to manage earnings in light of the short-term debt is likely to be moderated by the monitoring benefits of short-term debt. In our empirical tests we follow Datta et al. (2005) and classify investment grade firms as high creditworthy firms. This benefit is not expected for lesser creditworthy firms, since the financial-distress-related

[6] We corroborate Gupta et al.'s (2008) result of a positive relation between short-term-debt proportion and accruals-based earnings management for a large sample of firms (untabulated).

incentives to manage earnings are likely to cancel out or outweigh the monitoring benefits from short-term debt in those firms. Similar arguments are used by Datta et al. (2005) in their study of the relation between agency costs and debt maturity and by Ghosh and Moon (2010). Thus, we reason that the relation between debt maturity and accruals-based earnings management is conditioned by the creditworthiness of the firm. We recognize that a negative relation between short-term debt and accruals-based earnings management in higher creditworthy firms may be confounded by the stronger governance mechanisms in those firms (Ashbaugh-Skaife et al., 2006). As noted, we therefore we add several governance control variables to our model.

Our two hypotheses, in alternate form are:

H1. There is a positive relation between short-term debt and accruals-based earnings management for lower creditworthy firms.

H2. The positive relation between short-term debt and accruals-based earnings management is weaker for high creditworthy firms.

3. Methodology and data

3.1. Methodology

To measure earnings management one needs to capture managers' flexibility in adjusting the reported earnings. One convenient way that is available to managers in adjusting earnings is to manipulate accruals (for example, Warfield et al., 1995; Becker et al., 1998; Bartov et al., 2000). In particular, current accruals are considered easier to manipulate and are more correlated with firms' operations and profitability (Bradshaw et al., 2001; Ashbaugh et al., 2003), and since current accruals may vary significantly and systematically across firms with different business conditions (such as sales), a better measure of earnings management discretion is to control for the effects of business conditions and compare accruals across firms that arise from managerial discretion. Hence, we also decompose the level of total accruals into discretionary and non-discretionary components, with the discretionary accruals being used as a proxy for insiders' discretion in determining the reported earnings. Finally, our main tests are conducted based on the absolute value of discretionary accruals under the premise that upwards as well as downward adjustments of reported earnings are considered as earnings management that lowers the quality of reported earnings (Myers et al., 2003; Gul et al., 2009).

We calculate discretionary accruals following procedures as proposed in Kothari et al. (2005) and used by Ashbaugh et al. (2003), among others. In the first step we estimate the following model for each year and for each two-digit SIC code:

$$CA_t = \alpha_1(1/ASSETS_{t-1}) + \alpha_2 \Delta SALES_t + \alpha_3 ROA_{t-1} + \varepsilon_t \quad (1)$$

where CA is the current accruals divided by beginning of year total assets (COMPUSTAT annual data item 6), where current accruals are measured as net income before extraordinary items (COMPUSTAT annual data item 123) plus amortization and depreciation (COMPUSTAT annual data item 125) minus operating cashflows (COMPUSTAT annual data item 308) divided by beginning-of-fiscal-year total assets; $ASSETS_{-1}$ the total assets (COMPUSTAT annual data item 6) at the start of the fiscal year; ΔSALES the net sales revenue (COMPUSTAT annual data item 12) in year t less net sales revenue in year $t-1$ divided by beginning-of-fiscal-year total assets and ROA_{-1} is the return on assets for the prior fiscal year (COMPUSTAT annual data item 172 divided by COMPUSTAT annual data item 6).

The parameter estimates from Eq. (1) are used to predict the firm's expected current accruals (ECA) as follows:

$$ECA_t = \acute{\alpha}_1(1/ASSETS_{t-1}) + \acute{\alpha}_2(\Delta SALES_t - \Delta AR_t) + \acute{\alpha}_3 ROA_{t-1} \quad (2)$$

where AR is the accounts receivable (COMPUSTAT data item 2) in year t less accounts receivable in year $t-1$ divided by beginning-of-fiscal-year total assets.

Our dependent variable in Eq. (3) below, LOGREDCA is measured as the natural logarithm of the absolute value of CA minus expected accruals ECA from Eq. (2). We use the absolute value of discretionary accruals to capture both upward and downward adjustment of reported earnings (e.g. Warfield et al., 1995). The interaction term, DEBT3 $\times$ IG, differentiates between the benefits and costs of short-term debt between the investment and non-investment grade firms. The following regression model is estimated:

$$LOGREDCA_{it} = \alpha_0 + \alpha_1 DEBT3_{it} + \alpha_2 IG_{it} + \alpha_3 DEBT3 \times IG_{it} + CONTROLS + \varepsilon_{it} \quad (3)$$

where LOGREDCA is the natural logarithm of the absolute value of discretionary accruals estimated from Eqs. (1) and (2); DEBT3 the proportion of long-term debt maturing within 3 years of fiscal year end (COMPUSTAT annual data items 44 + 91 + 92) divided by total debt (COMPUSTAT annual data items 9 + 34); IG the 1 if the firm is rated by Standard and Poors (S&P) according to COMPUSTAT annual data item 280 as BBB- or above in that year and 0 otherwise; DEBT3 $\times$ IG is the proportion of debt maturing within 3 years of fiscal year end multiplied by IG.

Control variables	
BIG4	1 if the firm is audited by Arthur Andersen, Deloitte & Touche, Ernst & Young, KPMG, Price Waterhouse, Coopers and Lybrand or PricewaterhouseCoopers and 0 otherwise
L1ACCRUAL	last year's total current accruals
SIZE	natural logarithm of market value of equity (COMPUSTAT annual data item 199 multiplied by COMPUSTAT annual data item 25) measured in millions of dollars
MERGER	1 if the firm engaged in a merger or acquisition as identified by COMPUSTAT annual data item AFTNT1 and 0 otherwise
FINANCING	1 if Merger is not equal to one and number of shares outstanding increased by at least 10% or long-term debt increased by at least 20% over the year and 0 otherwise
LEVERAGE	total assets less book value of common equity (COMPUSTAT annual data item 60) divided by total assets
MB	market value of equity divided by book value of common equity
LITIGATION	1 if the firm operates in a high litigation industry and 0 otherwise, where high litigation industries are defined as SIC codes 2833–2836, 3570–3577, 3600–3674, 5200–5961 and 7370
LOSS	1 if the firm reports a loss in the fiscal year and 0 otherwise
CFO	cash flow from operations divided by beginning-of-fiscal-year total assets
STDSALE	standard deviation of sales divided by total assets calculated over the current and prior 4 years
MANOWN	percentage of shares held by directors
INDPC	percentage of independent directors on the board
CEODUAL	1 if the Chairperson is also the CEO and 0 otherwise
BSIZE	number of directors on the board
IND	industry dummies based on two-digit industry SIC numbers
YEAR	year dummies

Control variables are included based on the findings of prior studies and where possible, we include predictions for the coefficients' signs. Prior studies suggest that firms audited by Big 6, 5 or 4 auditors are associated with lower levels of discretionary accruals (e.g. Becker et al., 1998), thus a negative coefficient is expected for BIG4. MERGER and FINANCING are included to capture the incentive to manage earnings when firms are engaged in mergers or when obtaining external finance. Positive relations are expected for the coefficients of these variables as in Ashbaugh et al. (2003). SIZE, LEVERAGE, LITIGATION and LOSS are proxies for risk and riskier firms are more likely to manage earnings. Thus the coefficient sign for SIZE is expected to be negative while the signs for the remaining three variables' coefficients are expected to be positive. STDSALE is included as a control for the firm's underlying operating volatility, which is found to be positively correlated with unsigned discretionary accruals (Hribar and Nichols, 2007). High growth firms are more likely to engage in opportunistic behaviors, and hence we expect a positive coefficient for MB. L1ACCRUAL and CFO are included to control for unidentified or mechanical changes in accruals over time, and CFO is also a measure of profitability. MANOWN is included because Datta et al. (2005) report that DEBT3 is positively correlated with insiders' shareholdings. We expect a negative relation between discretionary accruals and MANOWN because MANOWN is inversely related to the level of agency costs (Datta et al., 2005). The percentage of independent directors on the board (INDPC) and the CEO duality dummy (CEODUAL) are included because prior research finds that these variables are associated with accounting quality measures (see, for example, Beasley, 1996; Dechow et al., 1996). We include board size (BSIZE) because prior literature supports an association between board size and accounting quality, although the direction of the association is unclear. Beasley (1996) finds larger boards are associated with a greater likelihood for financial statement fraud, and Jensen (1986) and Yermack (1996) argue for a positive relation between board size and agency costs. However, Cheng (2008) reports that large boards are associated with lower accruals. The results from prior research suggest that the relation between board size and earnings management is ambiguous, so we have no expectation for the sign of this coefficient. Industry and Year dummy variables are included to control for fixed effects related to industry groups and years but we do not report these results for brevity. All our regressions are estimated using clustered standard errors by firm, because a firm can appear more than once in our sample (Petersen, 2008).

3.2. Data

Our initial sample covers all US non-financial industry firms in COMPUSTAT, with debt outstanding at fiscal year end over the period 2003–2006. We delete non-US and financial industry (SIC codes 6000–6999) firms, because we focus on one country and COMPUSTAT does not provide debt maturity data for financial firms. We also delete firms with debt proportions greater than 1 or less than zero consistent with prior studies (Barclay and Smith, 1995). Because we also need governance data for some control variables including board size, board independence, CEO duality, managerial ownership, the sample reduces to 3324 firm years (1137 unique firms). We obtain this governance data from the RiskMetrics (previously IRRC) database and hand collected from EDGAR. Table 1 shows the sample data. The number of unique firms for the investment grade and non-investment grade samples does not total to the number for the whole sample because some firms experience rating changes and appear more than once in each sample as a consequence.

Table 2 reports descriptive statistics for the variables used in the study. The absolute value of discretionary accruals (REDCA) has a mean (median) of 0.056 (0.030). Since this measure is bounded at zero, we use the natural logarithm of

Table 1
Number of firm years and unique firms for the investment grade and non-investment grade samples (2003–2006).

	Firm years	Unique firms
Investment grade	1267	401
Non-investment grade	2057	785
Total	3324	1137

Rated firms have long-term debt rated by Standard and Poor's as indicated by a non-zero number in *COMPUSTAT* annual data item 280. Investment grade firms are firms with a S&P rating of BBB- and above. Non-investment grade firms are rated firms with a S&P rating below BBB- and unrated firms.

Table 2
Descriptive statistics for the sample 2003–2006, $N = 3324$.

Variables	Mean	Median	Std. dev.	P25	P75
REDCA	0.056	0.030	0.101	0.013	0.062
LOGREDCA	−3.617	−3.499	1.276	−4.310	−2.783
DEBT3	0.377	0.290	0.326	0.109	0.560
IG	0.381	0.000	0.486	0.000	1.000
BIG4	0.967	1.000	0.180	1.000	1.000
L1ACCRUAL	−0.016	−0.010	0.087	−0.036	0.012
SIZE	7.634	7.525	1.515	6.657	8.604
MERGER	0.241	0.000	0.428	0.000	0.000
FINANCING	0.253	0.000	0.435	0.000	1.000
LEVERAGE	0.582	0.561	0.384	0.433	0.691
MB	2.829	2.261	4.093	1.599	3.471
LITIGATION	0.242	0.000	0.428	0.000	0.000
LOSS	0.147	0.000	0.354	0.000	0.000
CFO	0.106	0.101	0.112	0.060	0.153
STDSALE	0.136	0.105	0.211	0.068	0.149
MANOWN	0.028	0.007	0.067	0.003	0.021
INDPC	0.719	0.750	0.144	0.625	0.833
CEODUAL	0.758	1.000	0.435	1.000	1.000
BSIZE	9.328	9.000	2.216	8.000	11.000

REDCA = absolute value of discretionary accruals estimated based on Eqs. (1) and (2); LOGREDCA = natural logarithm of REDCA; DEBT3 = proportion of long-term debt maturing within 3 years of fiscal year end; IG = 1 if the Standard and Poor's rating (COMPUSTAT annual data item 280) is BBB- or higher and 0 otherwise; BIG4 = 1 if the firm is audited by Deloitte & Touche, Ernst & Young, KPMG, or PricewaterhouseCoopers and 0 otherwise; L1ACCRUAL = Last year's total current accruals equal to net income before extraordinary items (COMPUSTAT annual data item 123) plus depreciation and amortization (COMPUSTAT annual data item 125) minus operating cash flows (COMPUSTAT annual data item 308) divided by beginning of year total assets (COMPUSTAT annual data item 6); SIZE = natural logarithm of market value of equity (COMPUSTAT annual data item 199 multiplied by COMPUSTAT annual data item 25) measured in millions of dollars; MERGER = 1 if the firm engaged in a Merger or acquisition as identified by COMPUSTAT annual data item AFTNT1 and 0 otherwise; FINANCING = 1 if Merger is not equal to zero and number of shares outstanding increased by at least 10% or long-term debt increased by at least 20%; LEVERAGE = Total assets less book value of common equity (COMPUSTAT annual data item 60) divided by total assets; MB = market value of equity divided by book value of equity; LITIGATION = 1 if the firm operates in a high litigation industry and 0 otherwise, where high litigation industries are defined as SIC codes 2833–2836, 3570–3577, 3600–3674, 5200–5961 and 7370; LOSS = 1 if the firm reports a loss in the fiscal year and 0 otherwise; CFO = Cash flow from operations divided by beginning of year total assets; STDSALE = standard deviation of sales revenue (COMPUSTAT annual data item 12) scaled by total assets calculated over the current and prior 4 years; MANOWN = Percentage of shares held by directors; INDPC = Percentage of independent directors on the board; CEODUAL = 1 if the firm has a CEO that is also the Chairman of the board of directors and 0 otherwise; BSIZE = number of directors on the board; Industry and Year dummy variable statistics are not reported for brevity.

REDCA (denoted LOGREDCA) as the dependent variable in our regression tests. Short-term debt (DEBT3) has a mean (median) of 0.377 (0.290) and an interquartile range of 0.451, indicating wide variation in values for short-term debt in the sample. Investment grade firms make up about 38% of the sample and about 97% of firms are audited by a Big4 accounting firm. The market to book mean (median) of 2.829 (2.261) suggests the average firm in the sample has good growth opportunities.

Table 3 shows the Pearson correlation coefficients for the regression variables except for the industry and year dummies, and *p*-values from two-tailed tests of significance. The table shows that DEBT3 is positively correlated with the dependent variable, LOGREDCA and *DEBT3* is correlated with most of the control variables. This suggests that these control variables should not be omitted from the regressions without the risk of bias.[7]

[7] We find that the highest correlation coefficient is that between investment grade dummy and market value of equity (0.61). As a sensitivity test we re-estimate our model by excluding market value of equity and the results are qualitatively similar (untabulated). This suggests that our results are unlikely to be adversely affected by multicollinearity problems.

Table 3
Pearson correlation coefficients and *p*-values.

	DEBT3	IG	BIG4	L1ACCRUAL	SIZE	MERGER	FINANCING	LEVERAGE	MB	LITIGATION	LOSS	CFO	STDSALE	MANOWN	INDPC	CEODUAL	BSIZE
LOGREDCA	0.10	−0.17	−0.05	−0.12	−0.16	0.02	0.07	0.04	0.03	0.13	0.19	0.00	0.06	0.04	−0.03	−0.08	−0.15
	0.01	0.01	0.00	0.01	0.01	0.30	0.01	0.04	0.07	0.01	0.01	0.94	0.00	0.04	0.15	0.01	0.01
DEBT3		−0.11	−0.08	−0.02	−0.14	−0.04	−0.09	−0.09	0.07	0.06	0.04	−0.01	−0.02	0.06	−0.09	−0.08	−0.17
		0.01	0.01	0.18	0.01	0.03	0.01	0.01	0.01	0.00	0.02	0.54	0.22	0.00	0.01	0.01	0.01
IG			0.11	0.04	0.61	0.02	−0.08	0.04	0.05	−0.10	−0.25	0.10	−0.06	−0.15	0.13	0.19	0.43
			0.01	0.02	0.01	0.31	0.01	0.03	0.00	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01
BIG4				0.04	0.20	0.01	−0.02	−0.02	0.00	−0.06	−0.07	0.06	−0.01	−0.09	0.06	0.08	0.12
				0.04	0.01	0.40	0.19	0.25	0.83	0.00	0.01	0.00	0.50	0.01	0.00	0.01	0.01
L1ACCRUAL					0.04	0.01	−0.03	−0.18	0.02	−0.08	−0.16	0.11	−0.02	0.03	0.03	0.01	0.03
					0.02	0.62	0.05	0.01	0.18	0.01	0.01	0.01	0.32	0.07	0.10	0.45	0.11
SIZE						0.07	−0.05	−0.08	0.17	0.00	−0.29	0.26	−0.06	−0.20	0.11	0.20	0.49
						0.00	0.00	0.01	0.01	0.83	0.01	0.01	0.00	0.01	0.01	0.01	0.01
MERGER							0.21	−0.05	0.00	−0.06	−0.03	0.05	0.01	−0.02	−0.01	0.01	−0.01
							0.01	0.01	0.81	0.00	0.07	0.00	0.55	0.35	0.66	0.43	0.51
FINANCING								0.07	−0.01	0.02	0.03	−0.02	0.02	0.00	−0.04	−0.01	−0.06
								0.01	0.74	0.32	0.09	0.22	0.24	0.96	0.03	0.74	0.00
LEVERAGE									−0.08	−0.06	0.19	−0.46	0.01	−0.04	0.05	0.04	0.06
									0.01	0.00	0.01	0.01	0.62	0.02	0.00	0.02	0.00
MB										0.06	−0.08	0.13	−0.02	−0.03	−0.01	0.01	0.02
										0.00	0.01	0.01	0.19	0.14	0.73	0.41	0.23
LITIGATION											0.09	0.03	−0.02	−0.02	−0.09	−0.05	−0.10
											0.01	0.09	0.19	0.37	0.01	0.00	0.01
LOSS												−0.38	0.01	−0.03	0.01	−0.08	−0.15
												0.01	0.59	0.07	0.40	0.01	0.01
CFO													0.00	0.02	−0.04	0.02	0.05
													0.88	0.26	0.01	0.27	0.00
STDSALE														0.03	0.00	−0.01	−0.06
														0.06	0.80	0.39	0.00
MANOWN															−0.26	−0.02	−0.09
															0.01	0.38	0.01
INDPC																0.12	0.08
																0.01	0.01
CEODUAL																	0.14
																	0.01

REDCA = absolute value of discretionary accruals estimated based on Eqs. (1) and (2); LOGREDCA = natural logarithm of REDCA; DEBT3 = proportion of long-term debt maturing within 3 years of fiscal year end; IG = 1 if the Standard and Poor's rating (COMPUSTAT annual data item 280) is BBB- or higher and 0 otherwise; BIG4 = 1 if the firm is audited by Deloitte & Touche, Ernst & Young, KPMG, or PricewaterhouseCoopers and 0 otherwise; L1ACCRUAL = Last year's total current accruals equal to net income before extraordinary items (COMPUSTAT annual data item 123) plus depreciation and amortization (COMPUSTAT annual data item 125) minus operating cash flows (COMPUSTAT annual data item 308) divided by beginning of year total assets (COMPUSTAT annual data item 6); SIZE = natural logarithm of market value of equity (COMPUSTAT annual data item 199 multiplied by COMPUSTAT annual data item 25) measured in millions of dollars; MERGER = 1 if the firm engaged in a Merger or acquisition as identified by COMPUSTAT annual data item AFTNT1 and 0 otherwise; FINANCING = 1 if Merger is not equal to zero and number of shares outstanding increased by at least 10% or long-term debt increased by at least 20%; LEVERAGE = Total assets less book value of common equity (COMPUSTAT annual data item 60) divided by total assets; MB = market value of equity divided by book value of equity; LITIGATION = 1 if the firm operates in a high litigation industry and 0 otherwise, where high litigation industries are defined as SIC codes 2833–2836, 3570–3577, 3600–3674, 5200–5961 and 7370; LOSS = 1 if the firm reports a loss in the fiscal year and 0 otherwise; CFO = Cash flow from operations divided by beginning of year total assets; STDSALE = standard deviation of sales revenue (COMPUSTAT annual data item 12) scaled by total assets calculated over the current and prior 4 years; MANOWN = Percentage of shares held by directors; INDPC = Percentage of independent directors on the board; CEODUAL = 1 if the firm has a CEO that is also the Chairman of the board of directors and 0 otherwise; BSIZE = number of directors on the board; Year and Industry dummy variable results are not reported for brevity. Two-tailed *p*-values are reported under each coefficient.

Table 4
Results from estimating Eq. (3).

Variables	Predicted sign	Dependent variable					
		LOGREDCA		LOGREDCA		LOGPosREDCA	
		Coeff	*p*-Value	Coeff	*p*-Value	Coeff	*p*-Value
INTERCEPT	?	−2.93	<0.01	−2.84	<0.01	−2.25	0.28
DEBT3	+	0.38	0.01	0.54	<0.01	0.20	0.03
IG	−	0.01	0.88	−0.01	0.955	−0.05	0.54
DEBT3 × IG	−	−0.41	0.01	−0.48	0.002	−0.20	0.02
BIG4	−	−0.06	0.66	−0.32	<0.01	0.24	0.11
L1ACCRUAL	−	−1.03	0.01	−0.37	<0.01	−2.11	0.10
SIZE	−	−0.04	0.11	−0.08	<0.01	−0.05	0.14
MERGER	+	0.06	0.27	−0.01	0.857	−0.13	0.09
FINANCING	+	0.17	0.01	0.34	<0.01	0.24	0.14
LEVERAGE	+	0.21	0.01	0.09	<0.01	−0.30	0.07
MB	+	0.01	0.09	0.01	0.053	0.01	0.51
LITIGATION	+	0.31	0.01	0.27	<0.01	0.37	0.04
LOSS	+	0.57	0.01	0.19	<0.01	−0.14	0.52
CFO	?	1.23	0.01	−0.56	<0.01	−2.37	0.20
STDSALE	+	0.30	0.02	0.27	0.061	0.34	0.20
MANOWN	−	0.40	0.19			1.02	0.22
INDPC	−	0.22	0.21			0.33	0.04
BSIZE	?	−0.02	0.04			−0.05	0.47
CEODUAL	+	−0.12	0.02			−0.14	0.04
INDUSTRY DUMMIES		Yes		Yes		Yes	
YEAR DUMMIES		Yes		Yes		Yes	
N		3324		8892		1358	
Adj. *R*-sq.		0.12		0.30		0.18	

REDCA = absolute value of discretionary accruals estimated based on Eqs. (1) and (2); LOGREDCA = natural logarithm of REDCA; PosREDCA = Income-increasing discretionary accruals estimated based on Eqs. (1) and (2); LOGPosREDCA = natural logarithm of PosREDCA; DEBT3 = proportion of long-term debt maturing within 3 years of fiscal year end; IG = 1 if the Standard and Poor's rating (COMPUSTAT annual data item 280) is BBB- or higher and 0 otherwise; BIG4 = 1 if the firm is audited by Deloitte & Touche, Ernst & Young, KPMG, or PricewaterhouseCoopers and 0 otherwise; L1ACCRUAL = Last year's total current accruals equal to net income before extraordinary items (COMPUSTAT annual data item 123) plus depreciation and amortization (COMPUSTAT annual data item 125) minus operating cash flows (COMPUSTAT annual data item 308) divided by beginning of year total assets (COMPUSTAT annual data item 6); SIZE = natural logarithm of market value of equity (COMPUSTAT annual data item 199 multiplied by COMPUSTAT annual data item 25) measured in millions of dollars; MERGER = 1 if the firm engaged in a Merger or acquisition as identified by COMPUSTAT annual data item AFTNT1 and 0 otherwise; FINANCING = 1 if Merger is not equal to zero and number of shares outstanding increased by at least 10% or long-term debt increased by at least 20%; LEVERAGE = Total assets less book value of common equity (COMPUSTAT annual data item 60) divided by total assets; MB = market value of equity divided by book value of equity; LITIGATION = 1 if the firm operates in a high litigation industry and 0 otherwise, where high litigation industries are defined as SIC codes 2833–2836, 3570–3577, 3600–3674, 5200–5961 and 7370; LOSS = 1 if the firm reports a loss in the fiscal year and 0 otherwise; CFO = Cash flow from operations divided by beginning of year total assets; STDSALE = standard deviation of sales revenue (COMPUSTAT annual data item 12) scaled by total assets calculated over the current and prior 4 years; MANOWN = Percentage of shares held by directors; INDPC = Percentage of independent directors on the board; CEODUAL = 1 if the firm has a CEO that is also the Chairman of the board of directors and 0 otherwise; BSIZE = number of directors on the board; Year and Industry dummy variable results are not reported for brevity. Two-tailed *p*-values are reported.

4. Results and discussion

4.1. Main findings

In this section we report results for testing hypotheses 1 and 2. Since short-term debt increases liquidity risk and consequently the incentive to manage earnings, we expect the coefficient for *DEBT3* to be positive. Recall that our dummy variable is zero for non-investment grade firms so the coefficient for DEBT3 represents the effect of short-term debt on REDCA for non-investment grade firms. In addition, our expectation is that monitoring benefits are relatively stronger vis-à-vis financial distress incentives to manage earnings, for high-creditworthy firms, we expect the short-term debt and investment grade interaction variable to be significant and to have a negative sign. Two-tailed tests for significance testing are used for consistency, because we do not have directional predictions for the coefficient signs of all independent variables.

Table 4 presents results for estimating Eq. (3). Using our main sample ($N = 3324$), it is revealed that the coefficient for short-term debt, is, as predicted, positive and significant (coeff = 0.378, $p = 0.001$). This coefficient indicates that for non-investment grade firms, more short-term debt is associated with higher discretionary accruals. The interaction coefficient is significantly negative (coeff = −0.414, $p = 0.01$), indicating that the positive association between short-term debt and discretionary accruals is weaker for investment grade firms. This result is consistent with our expectation that firms with higher creditworthiness (investment grade firms) are associated with more monitoring benefits of short-term debt. Regarding the control variables, the significant coefficients are generally in the expected directions or are insignificant.

Our main sample is restricted to 3324 firm-year observations since we require the availability of governance data. We relax this requirement and estimate Eq. (3) without governance variables, using an extended sample of 8892 observations.

Table 5
Additional analyses based on CEO equity-based compensation (COMP).

Variables	Predicted sign	Full sample with 3-way interaction		High COMP		Low COMP		Exclude IG = 1 and low COMP	
		Coeff	*p*-Value	Coeff	*p*-Value	Coeff	*p*-Value	Coeff	*p*-Value
INTERCEPT	?	−3.11	<.01	−4.25	<0.01	−2.03	<0.01	−3.16	<0.01
DEBT3	+	0.36	0.02	0.38	0.00	0.36	0.01	0.36	0.00
IG	−	−0.07	0.63	0.00	0.99	0.00	0.97	0.10	0.38
DEBT3 × IG	−	0.32	0.29	−0.51	0.03	0.16	0.48	−0.48	0.03
COMP	+	0.31	0.06						
DEBT3 × COMP	?	−0.01	0.96						
DEBT3 × COMP × IG	−	**−1.20**	**0.03**						
COMP × IG	?	0.12	0.66						
BIG4	−	−0.02	0.90	−0.03	0.91	−0.01	0.95	−0.02	0.91
L1ACCRUAL	−	−0.99	0.00	−0.25	0.64	−1.75	0.00	−0.97	0.01
SIZE	−	−0.06	0.04	−0.06	0.10	−0.07	0.03	−0.04	0.13
MERGER	+	0.06	0.33	0.01	0.87	0.12	0.14	0.04	0.50
FINANCING	+	0.18	0.00	0.21	0.01	0.16	0.06	0.20	0.00
LEVERAGE	+	0.23	0.01	0.48	0.01	0.12	0.12	0.21	0.02
MB	+	0.01	0.49	0.02	0.02	−0.02	0.17	0.01	0.37
LITIGATION	+	0.36	<0.01	0.53	<0.01	0.16	0.14	0.44	<0.01
LOSS	+	0.54	<0.01	0.59	<0.01	0.51	<0.01	0.53	<0.01
CFO	?	1.27	0.02	1.62	0.00	1.26	0.05	1.11	0.04
STDSALE	+	0.27	0.03	0.37	0.00	0.22	0.21	0.22	0.04
MANOWN	−	0.66	0.07	0.23	0.75	0.53	0.20	0.58	0.13
INDPC	−	0.18	0.36	0.37	0.20	0.00	1.00	0.28	0.22
BSIZE	?	−0.02	0.08	−0.01	0.71	−0.03	0.04	−0.03	0.08
CEODUAL	+	−0.09	0.15	−0.13	0.10	−0.01	0.88	−0.11	0.10
INDUSTRY DUMMIES		Yes		Yes		Yes		Yes	
YEAR DUMMIES		Yes		Yes		Yes		Yes	
N		2651		1326		1325		2164	
Adj. *R*-sq.		0.13		0.15		0.13		0.13	

COMP = the percentage of equity-based compensation for the CEO. See Table 4 for the definitions of all other variables Two-tailed *p*-values are reported.

The estimation results using this extended sample, as reported in Table 4, are qualitatively similar to that reported using our main sample ($N = 3324$).[8] In another sensitivity test (untabulated) we also obtain qualitatively similar findings when we extend our sample to earlier years (1997–2006). These results suggest that the generalizability of our results is unlikely to be an important issue, and our findings are robust no matter if governance variables are included.

In addition, some studies (e.g. Ashbaugh et al., 2003) suggest that income-increasing discretionary accruals are more likely to be associated with opportunistic earnings management, since earnings overstatements are more frequent and of greater concern to users of financial statements. We also conduct tests using samples with positive (i.e. income-increasing) discretionary accruals, reducing the sample to 1358 observations. These tests gave similar inferences to the main tests.

4.2. Controlling for alternative explanation

It could be argued that firms with higher credit ratings have a lower level of financial distress and have lower incentives to manage earnings as a consequence. As such, it is *prima facie* unclear as to whether our results are driven by the stronger monitoring role of the creditors or by the weaker incentives to manage earnings.[9] We examine this alternative explanation based on the following additional analyses.

First, we examine the effects of equity-based management compensation on our experimental variable. Because there is a positive relation between the proportion of equity compensation and the incentive to manage earnings (Healy, 1985; Bergstresser and Philippon, 2006), we expect the effects of debt monitoring to be stronger when equity compensation is higher for firms with higher creditworthiness. In other words, we identify a situation that differentiates high and low incentives to manage earnings for firms with stronger monitoring effects, and we expect the monitoring effect is stronger for firms with higher earnings management incentives. Following Bergstresser and Philippon (2006), we measure the percentage of equity-based compensation for the CEO (COMP) and include this variable and its interaction with the other experimental variables in model (3).[10] Our focus is the coefficient for the three-way interaction between COMP, DEBT3 and IG. If debt monitoring is not the explanation for the main results, then the level of equity-based compensation should

[8] It should be noted that the adjusted R^2 increases significantly (to 0.30) using this extended sample when compared with 0.12 using the main sample ($N = 3324$). This is mainly due to the increase in test power as the sample size increases significantly.

[9] We thank the anonymous reviewer and the editor for this alternative explanation.

[10] We include the following variables: COMP × DEBT3, COMP × IG and COMP × DEBT3 × IG.

have no effect on those results, indicated by an insignificant coefficient for this three-way interaction variable. The sample size falls to 2651 because we exclude observations with missing compensation data from ExecuComp. Our results, as reported in Table 5, show that the coefficient for the three-way interaction is −1.12 (p-value = 0.03), indicating that discretionary accruals are lower for investment grade firms with higher short-term debt at higher proportions of CEO equity compensation. We also find that the coefficient for DEBT3 × IG is no longer significant (p-value = 0.29), suggesting that for the group of investment grade firms that have lower incentives to manage earnings, the monitoring effect is not statistically obvious due to the lower demand for monitoring.

To provide further evidence on the issue and allow the coefficients of the control variables to vary across the firms with high and low equity-based compensation, we also split the sample at the median of COMP and re-estimate model (3) for the low and high COMP samples. Table 5 shows that the coefficient for the interaction of DEBT3 and IG is negative and significant for the high COMP sample (coeff = −0.51, p-value = 0.03), but not for the low COMP sample (coeff = 0.16, p-value = 0.48). These results support our monitoring argument, and suggest that such effect is more pronounced for investment-grade firms with stronger incentives to manage earnings.

In the two far-right columns of Table 5, we further assess whether the lower earnings management incentives for investment grade firms is the main driver of our results. We delete the firms in the investment grade category in our sample (IG = 1) that have below median COMP, and re-estimate model (3). The sample reduces to 2164, and we find that the results are qualitatively similar to our main findings as reported in Table 4. This shows that, despite the existence of this alternative explanation, our results documented in Table 4, is unlikely to be purely driven by the lower incentive to manage earnings for firms with higher creditworthiness.

In a separate, untabulated test, we use a matched-pair design to control for the level of financial health for the two groups of firms, which partially controls for the incentive to manage earnings associated with financial health. Specifically, we match each of the observations in the investment grade sample with an observation in the non-investment grade sample by (1) year, (2) industry, (3) financial health (based on Altman's Z-score), and (4) size (based on total assets). We exclude those observations in the investment grade sample without a matched non-investment grade observation being identified, reducing the investment grade firms from 1267 to 1259. Using this matched sample (1259 investment grade firms + 1259 matched non-investment grade firms = 2518 observations), we find that the coefficient for DEBT3 is 0.27 (p-value = 0.01), while the coefficient for the interaction term DEBT3 × IG is −0.31 (p-value = 0.04), consistent with the main findings. This result also reduces the concern that our results are purely driven by the difference in financial health (and hence the incentive to manage earnings) between the investment grade sample and the non-investment grade sample. In summary, the collective evidence from all the above analyses suggests that (1) the monitoring effect is stronger for firms with higher creditworthiness when they have higher incentives to manage earnings, and (2) the results we documented in Table 4 is unlikely to be driven purely by the lower earnings management incentive argument.

4.3. Robustness tests

It is possible that among investment grade firms, those with less accruals-based earnings management self select short-term debt. To address this potential endogeneity problem, we use the method of instrumental variables and two-stage least squares regression. The term structure of interest rates and asset maturity are used as instruments and are defined as follows: TERMSTRUCTURE is defined as the month-end yield on 10-year government bonds less the month-end yield on 6-month government bonds; and ASSETMATis gross property, plant, and equipment (Compustat annual data item 7)/total assets (Compustat annual data item 6)) × (gross property, plant, and equipment (Compustat annual data item 7)/depreciation expense (Compustat annual data item 14)) + (current assets (Compustat annual data item 4)/total assets (Compustat annual data item 6)) × (current assets (Compustat annual data item 4)/cost of goods sold (Compustat annual data item 41)).[11] These two variables are used in the finance literature to explain debt maturity choice (see for example Datta et al., 2005).

The second stage regression results show that the coefficient for the predicted value of short-term debt has a positive coefficient of 3.81, and it is significant at the .01 level, consistent with the inferences from Eq. (3). Also consistent with Eq. (3), is the coefficient for the interaction between predicted short-term debt and the investment grade dummy variable. These results provide further support to those from Eq. (3) reported in Table 4. It is observed that, in this set of results the magnitude of the negative coefficient (−1.02) of the interaction term is not higher than that of the main effect (3.81), suggesting that the association between debt and earnings management does not switch from positive to negative. This implies that, while the positive debt/earnings management relation is significantly weaker for firms with high creditworthiness as predicted in hypothesis 2, the monitoring effects might not in all cases overwhelm the concerns of the managers in the potential risk of violating the debt covenants, even in cases for the investment grade sample. It is possible that other unobserved factors could also be in play in determining the final outcomes, which is one issue open to future research.

We repeat all tests using performance adjusted discretionary accruals (PADCA), which is measured using the procedure described Kothari et al. (2005) and used by Ashbaugh et al. (2003). In particular, observations are partitioned within each

[11] The yields on government bonds are obtained from the Federal Reserve economic database website.

two-digit SIC code into deciles based on their prior year's ROA, and PADCA is measured as the difference between a sample firm's discretionary accruals and the median of discretionary accruals for each ROA portfolio. This approach is argued to control for relative firm performance across random samples (Ashbaugh et al., 2003). We obtain similar results using this alternative specification of discretionary accruals.

Because short-term debt proportion does not necessarily measure the materiality of short-term debt, we repeat all the tests using short-term debt scaled by total assets (*Compustat* annual data item 6) at year end. The results using this measure of short-term debt are qualitatively similar to those tabulated. Finally, we measure a new dummy variable equal to one if the firm is investment grade and its short-term debt is above the median (*AboveMedianDebt3* $\times$ *IG*), replaced the IG dummy with this variable and removed the interaction variable. We find that this variable is significantly negative (coeff = -0.27, *t*-value = -4.01). In a separate test we estimate the model using a sample of firms with short-term debt above the median, and we find that the coefficient on IG is significantly negative (*t*-value = 2.56). Both of these results suggest that high creditworthy firms are associated with lower discretionary accruals in the high short-term debt group, consistent with the monitoring theory discussed in this paper.

5. Conclusion and limitations

Due to financial distress reasons, prior literature on the relation between accrual-based earnings management and debt generally assumes only a detrimental effect for debt. Lenders and others perform a monitoring role over borrowers and this monitoring reduces agency costs. Theory and empirical evidence from the finance literature suggests that short-term debt is more likely to inhibit opportunistic behavior by insiders than is long-term debt. We examine the extent of opportunistic behavior by insider's when monitoring is expected to be relatively more important, namely in high creditworthy firms. In high creditworthy firms, the level of financial distress and the consequent incentive to engage in opportunistic behavior are expected to be relatively low. Opportunistic behavior is proxied by accruals-based earnings management which is measured in terms of absolute value of discretionary accruals.

Using data for the 4-year period from 2003 to 2006, we find that the coefficient for short-term debt is positively associated with discretionary accruals for low creditworthy firms, consistent with financial distress theory. We also find that this positive relation is significantly weaker for investment grade firms, consistent with the monitoring of lenders reducing the opportunistic-financial-reporting behavior of managers. Our tests control for variables identified as important by prior studies, including corporate governance variables. In additional tests we find that investment grade firms exhibit significantly lower discretionary accruals for a sample of firms with above median short-term debt, consistent with the monitoring theory.

It is important to note that, like many similar studies, our measures of discretionary accruals are subject to measurement errors (Nichols, 2000). We attempt to circumvent this problem by using different measures of discretionary accruals. In addition, while we attempt to control and consider different corporate governance variables, it is possible that some facets of a firm's governance structures are not empirically observable and therefore are not fully controlled. Despite these limitations, given the array of variables we consider, and the battery of tests that we perform, we document robust findings that are consistent with our expectations. Further, we observe that the monitoring effects do not always dominate the financial distress effects for firms with high creditworthiness in some cases, suggesting that there could be other factors determining the observed association between debt and earnings management. Finally, it should be noted that while the negative relation between short-term debt and earnings management for high managerial ownership firms is consistent with lender monitoring, this evidence should not be interpreted as conclusive, because we have inferred monitoring by lenders rather than measuring lender monitoring itself. Our additional tests provide evidence that our results cannot be purely driven by the lower earnings management incentives for investment-grade firms, but this does not completely eliminate other potential alternative explanations. As such, the findings of this study should be viewed as a first step in understanding the mixed results on the issue. Future research may re-examine the issue with other, more direct lender monitoring proxies.

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Appendix A

See Table A1.

Table A1
Details of studies with "earnings management" or "earnings quality" in their title published in the journals: JAE, RAS, JAR, TAR, CAR, JFE and JBF from 2006 to 2008.

Article number	Author(s)	Jnl.	Title	Debt variable	Expectation	Coeff	Accruals model?
2008							
1	Ball & Shivak'r	JAE	Earnings quality at initial public offerings	N/A			No
2	Caramanis & Lennox	JAE	Audit effort and earnings management	(TL-cash)/TA	None	Pos	Yes
3	Chen et al.	CAR	Audit partner tenure, audit firm tenure, ...	No			Yes
4	Cohen et al.	TAR	Real and accrual-based earnings management...	No			Yes
5	Cook et al.	CAR	Earnings management through effective tax rates	N/A			No
6	Cornett et al.	JFE	Corporate governance and pay-for...	No			Yes
7	Francis & Wang	CAR	The joint effect of investor protection and Big 4	TL/TA	None	Neg	Yes
8	Francis et al.	CAR	CEO reputation and earnings quality	No			Yes
9	Francis et al.	JAR	Voluntary disclosure, earnings quality, and...	No			Yes
10	Gong et al.	JAE	Earnings management, lawsuits, and stock-for-...	N/A			No
11	LaFond	CAR	Discussion of "CEO Reputation and Earnings...	N/A			No
12	Lo	JAE	Earnings management and earnings quality	N/A			No
13	McAnally et al.	TAR	Executive stock options, missed earnings targets...	N/A			No
14	Nan	CAR	The agency problems of hedging and earnings...	N/A			No
15	Raman & Shah'r	TAR	Relationship-specific investments and earnings	TD/TA	None	Pos	Yes
16	Yu	JFE	Analyst coverage and earnings management	No			Yes
17	Zhao & Chen	TAR	Staggered Boards and earnings management	LTD/TA	Pos	Insig	Yes
2007							
18	Chen et al.	JAR	On the relation between conservatism in...	N/A			No
19	Fan	TAR	Earnings management and ownership...	1 − (BVE/TA)	Pos	Pos	Yes
20	Hribar & Nichols	JAR	The use of unsigned earnings quality measures in...	N/A			No
21	Jacob & Jorgensen	JAE	Earnings management and accounting income...	N/A			No
22	Jo & Kim	JFE	Disclosure frequency and earnings management	Debt/Equity	Pos	Insig	Yes
23	Jo et al.	RAS	Underwriter choice and earnings management	LTD/BVE	Pos	Insig	Yes
24	Kerstein & Rai	JAE	Intra-year shifts in the earnings distribution and...	N/A			
2006							
25	Ayers et al.	TAR	Discretionary accruals and earnings...	N/A			No
26	Baber et al.	RAS	Stock price reaction to evidence of...	N/A			No
27	Bergstresser & Philippon	JAE	CEO incentives and earnings management	Lagged book leverage	None	Insig	Yes
28	Burgstahler et al.	TAR	The importance of reporting incentives...	NCL/ (NCL + BVE)	None	Pos	Yes[a]
29	Coles et al.	JAE	Earnings management around employee...	N/A			No
30	Desai et al.	RAS	Do short sellers target firms with poor...	N/A			No
31	Ecker et al.	TAR	A returns-based representation of earnings...	N/A			No
32	Hribar et al.	JAE	Stock repurchases as an earnings...	N/A			No
33	Hunton et al.	TAR	Financial reporting transparency and...	N/A			No
34	Kim & Yi	CAR	Ownership structure, business group...	TD/TA	None	Pos	Yes
35	Lang et al.	JAE	Earnings management and cross listing: Are...	N/A			No
36	Lee et al.	RAS	Performance, growth and earnings...	N/A			No
37	McVay	TAR	Earnings management using classification...	N/A			No
38	Nagar	RAS	Discussion of "Performance, growth and...	N/A			No
39	Petrovits	JAE	Corporate-sponsored foundations and...	N/A			No
40	Roychowdhury	JAE	Earnings management through real	N/A			No

(*continued on next page*)

Table A1 (*continued*)

Article number	Author(s)	Jnl.	Title	Debt variable	Expectation	Coeff	Accruals model?
41	Wang	JAR	Founding family ownership and earnings…	TL/TA	Pos	Neg	Yes
42	Yee	CAR	Earnings quality and the equity risk…	N/A			No
43	Yu et al.	JBF	Earnings management at rights issues…	N/A			No
			Number positive		5	5	–
			Number negative		–	2	–
			Number insignificant		–	4	–
			Total		5	11	18

CAR = Contemporary Accounting Research, JAE = Journal of Accounting and Economics, JAR = Journal of Accounting Research, JBF = Journal of Banking and Finance, JCF = Journal of Corporate Finance, JFE = Journal of Financial Economics, RAS = Review of Accounting Studies and TAR = The Accounting Review; TL = total liabilities, TA = total assets; LTD = long-term debt; BVE = book value of equity; NCL = non-current liabilities.

[a] Burgstahler et al. (2006) use an earnings management index and an accruals based earnings management model is one input.

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