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"Earnings Management to avoid Debt Covenant Violations and Future Performance"

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Earnings Management to avoid Debt Covenant Violations and Future Performance[☼]

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Abstract: We provide large sample evidence regarding the association between earnings management, debt covenants, and future firm performance. Using both time-series and cross-sectional tests, we find strong evidence that firms engage in both real and accruals-based earnings management in order to avoid violating covenants. However, we find only weak evidence that firms engage in relatively more (less) earnings management when the expected costs of a violation are higher (lower). These results are consistent with managers having strong incentives (due to career concerns) to avoid violating a covenant even when shareholders' expected violation costs are low. Finally, we examine whether shareholders benefit when their firms engage in costly covenant-related earnings management. Firms engaging in both real and accruals-earnings management generally experience slower growth in ROA. In addition, real earnings management firms experience negative abnormal returns (roughly 10%). Our results indicate that shareholders incur real costs when their firms engage in real earnings management activities in order to avoid debt covenant violations. However, covenant violations are costly for shareholders: bank intervention following covenant violations appear to change the firm's operations in a way that is suboptimal for equity holders.

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1. Introduction

Prior literature (Beneish and Press (1993), Chava and Roberts (2008), Nini et al. (2009)) finds that shareholders experience substantial direct and indirect costs when firms violate debt covenants (i.e., technical defaults). Managers also experience personal violation costs as Ozelge and Saunders (2011) find that forced CEO turnover rates increase following covenant violations. Accordingly, the Debt Covenant Hypothesis predicts that firms manage earnings in order to avoid a debt covenant violation (Smith (1993)). Perhaps the strongest evidence supporting this hypothesis comes from Dichev and Skinner (2002). They study a large sample of firms with privately held loan contracts containing debt covenants and test whether realizations of financial ratios restricted by financial covenants appear to be random, or whether they appear to be opportunistically reported. Consistent with the Debt Covenant Hypothesis, they conclude that the distribution of financial ratios does not appear to be random. However, their distributional approach leaves unanswered the question about which types of violation-avoidance activities firms engage in. We provide evidence on this question by analyzing whether firms engage in real and/or accruals-based earnings management activities in response to debt covenant pressures.

There is considerable cross-sectional variation in the magnitude of covenant violation costs as some firms receive low cost waivers while others incur heavy costs (Beneish and Press (1995)). Demiroglu and James (2010) hypothesize that covenants are initially set tighter when the consequences of a violation are expected to be lower. Using post-violation reductions in investment spending and net debt issuance as measures of bank-imposed violation consequences, they find evidence consistent with their hypothesis. Similarly, Chava and Roberts (2008) find that post-violation reductions in capital expenditures are greater when *ex ante* agency conflicts or information frictions are larger. These findings suggest firms' incentives to engage in costly covenant-related earnings management vary cross-sectionally with the expected costs of a violation. Accordingly, we also examine whether covenant-related earnings management activities are associated with the expected costs of a violation.

The Debt Covenant Hypothesis assumes that covenant violations are costly to shareholders and the general consensus in the literature is that earnings management activities are also costly. Depending on the relative magnitude of these costs, it is possible that shareholders are better off when their managers successfully avoid a covenant violation by engaging in costly earnings

management. In contrast, Nini et al. (2010) argue that bank intervention following covenant violations actually benefits shareholders since bank intervention effectively reduces shareholder-manager agency costs. Supporting their argument, they find evidence that following covenant violations, firms experience faster growth in return on assets and positive abnormal stock returns. If correct, this raises an important question of whether debt covenant-related earnings management represents an agency cost as managers undertake harmful actions in order to reduce their turnover risk. To examine this issue, we show how covenant violations and earnings management are associated with the firm's accounting and market performance.

In order to provide evidence on how firms manage earnings to avoid a debt covenant violation, we examine the association between real and accruals-based earnings management proxies and incentives to avoid a debt covenant violation using two main approaches. First, we use a covenant violation sample that consists of almost 4,000 firms that reported initial covenant violations between 1996 and 2008. For this sample, we examine earnings management activities in event time from eight quarters prior to the violation through three quarters following the violation. The results show firms engaged in significantly positive real and accruals earnings management in the periods prior to the violation and that these activities quickly reversed at the time of the violation. This evidence strongly supports the Debt Covenant Hypothesis and helps answer the open question in Dichev and Skinner (2002) about which activities firms take to avoid violations.

In our second approach, we use a sample of private loan agreements that allows us to calculate how tight the accounting-based loan covenants are during each quarter (Dyreng (2010)). Doing so potentially allows us to more precisely estimate the magnitude of debt-covenant pressure. Using this sample, we examine the association between covenant tightness and various real and accruals management proxies after controlling for other known determinants of earnings management.[1] Overall, our results are consistent with the event-time results: covenant tightness is positively associated with both real and accruals based income-increasing earnings management.

[1] In a concurrent working paper, Kim et al. (2011) also analyze the association between real earnings management and the tightness one type of covenant (net worth) and find similar results to ours. However, they do not examine accruals-based management or conduct any event-time analyses. They do not examine the performance consequences of earnings management and covenant violations either.

We next examine whether covenant-related earnings management activities are associated with the expected costs of a violation. We use various proxies for the expected costs of a violation taken from the prior literature and interact them with the covenant tightness variable. While almost all of the estimated interaction coefficients have the predicted signs, relatively few of them are statistically significant. Overall, we view these results as providing only weak evidence that firms' earnings management activities are associated with expected violation costs. One explanation is that managers may have relatively stronger and more uniform incentives to avoid violating a covenant than firms do. Thus, our results may more reflect managers' job security concerns rather than careful cost-benefit analyses taken from shareholders' perspective.

Finally, we examine how accounting and market performance is associated with covenant violations and earnings management. To conduct these analyses, we first construct a matched-pair sample of firms that violate their covenants with non-violation firms that have similar covenant violation likelihoods. We analyze the effects of covenant violation and earnings management on future firm performance. Firms engaging in both real and accruals-earnings management generally experience significantly slower growth in return on assets over the next four quarters. In addition, firms engaging in real earnings management experience significantly negative abnormal returns (roughly 10%) regardless of whether they violate a covenant or not. However, abnormal returns for firms engaging in accruals management are only marginally lower than for non-accruals management firms. These results suggest that shareholders incur substantial costs when their firms engage in real earnings management activities in order to avoid debt covenant violations.

Violation firms generally experience higher growth in return on assets compared to non-violation firms. Further analyses are consistent with banks imposing increased cost discipline on violation firms, and that these cost decreases more than offsets lower sales growth. Consistent with the prior literature, violation firms experience large reductions in capital expenditures. In contrast, violation firms experience substantially worse market returns (roughly 10%) over the 12 months following a violation quarter compared to similar firms that do not violate a debt covenant. We interpret this evidence as indicating banks impose actions that increase the likelihood of the bank being repaid at the expense of foregoing positive NPV projects, which reduces shareholder value.

Our analyses contribute to the literature in at least four ways. First, we extend prior research on the Debt Covenant Hypothesis by examining both accruals management and real earnings management activities. Our results suggest that firms are willing to move beyond less costly accrual manipulations and incur substantial costs arising from real activities management in order to avoid violating debt covenants. Second, we find only limited evidence that firms' earning management activities are influenced by expected violation costs. We speculate that this limited responsiveness is due to shareholder-manager agency conflicts. Third, in contrast to Nini et al. (2010), our evidence suggests that bank intervention may change the operations of the firm in a way that is suboptimal for equity holders. Fourth, by showing future performance depends on the level of earnings management, we add to the small literature that examines the performance consequences of earnings management (Bhojraj et al. (2009), Cohen and Zarowin (2010), Gunny (2010)).

The rest of this paper is as follows. In Section 2, we develop our hypotheses and review the relevant literature. In Section 3, we describe our methodology and variable measurement while Section 4 discusses the samples and provides descriptive statistics. Section 5 presents our results on the association between earnings management and debt-covenants while Section 6 discusses the performance consequences analyses and results. Section 7 summarizes and concludes the paper.

2 Hypothesis development and related literature

Firms have incentives to avoid violating debt covenants to the extent that violations are costly. Early evidence based on small samples indicates that violations are costly to shareholders. For example, Beneish and Press (1993) observe that lenders raise interest rates and impose additional covenants following violations. Based on announcement period returns, Beneish and Press (1995) estimate that in aggregate, these costs are about 1.4% of equity value. In addition, firms often incur substantial opportunity costs as they are forced to sell off assets and reduce capital expenditures after violations. More recent studies provide additional evidence regarding these costs using large samples of violations.[2] Chava and Roberts (2008), Demiroglu and James

[2] In contrast, Dichev and Skinner (2002) conclude that "private lenders use debt covenant violations as a screening device, and frequently waive violations or reset covenants without imposing serious consequences on borrowing firms" (p. 1122) .

(2010), Nini et al. (2009), Roberts and Sufi (2009), and Sufi (2009) show that creditors force firms to reduce their capital expenditures and net debt issuance following technical defaults.

In addition to these shareholder costs, recent evidence indicates that managers also incur significant personal costs following violations. Nini et al. (2010) and Ozelge and Saunders (2011) find that the forced CEO turnover rate increases from between 60% to 98% following debt covenant violations. Creditors sometimes exert more direct control over managerial actions, which reduces the private benefits of control. For example, Baird and Rasmussen (2006) suggest that creditors frequently force violation firms to hire turnaround specialists as Chief Restructuring Officers as a condition of waiving technical defaults.

In summary, prior research finds that shareholders and managers experience substantial costs when they violate debt covenants. Given that covenants are frequently written in terms of accounting numbers, these violation costs provide managers with strong incentives to engage in earnings management activities that reduce the likelihood of a violation. Perhaps the strongest evidence consistent with this Debt Covenant Hypothesis comes from Dichev and Skinner (2002), who study a large sample of firms with privately held loan contracts. They test whether realizations of financial ratios restricted by financial covenants appear to be random, or whether they appear to be opportunistically reported.[3] They find that the distribution of financial ratios does not appear to be random and conclude that firms manage their accounting numbers.

While the results in Dichev and Skinner (2002) suggest that firms engage in activities that enable them avoid covenant violations, their analyses do not provide evidence on whether these activities involve accounting choices or "real" actions or both. Prior literature has generally focused on firms' use of accounting choices to avoid violations. Using a sample of 94 violation firms, DeFond and Jiambalvo (1994) find abnormal accruals are significantly positive in the year before a covenant violation. During the violation year, accruals are significantly positive only after controlling for management changes and going-concern qualifications. In contrast, DeAngelo et al. (1994) and Healy and Palepu (1990) do not find evidence consistent with firms making opportunistic accounting choices to avoid covenant constraints. In summary, while the

[3] As Dichev and Skinner (2002) acknowledge, an alternative explanation is that creditors systematically set initial covenant thresholds just below actual values. Demiroglu and James (2010) conduct an in-depth analysis of the determinants of initial debt covenant thresholds and find that roughly half of initial covenants are set tightly and that covenant tightness is associated with future changes in covenant variables.

existing evidence generally supports the Debt Covenant Hypothesis, it is somewhat weak, mixed, and often based on small samples of relatively distressed firms.

While violating debt covenants is costly, managing accruals is also costly. Accruals management can lead to increased scrutiny by auditors and regulators as well as potential lawsuits by investors. Banks are sophisticated financial intermediaries that have strong incentives to prevent opportunistic accounting choices through their monitoring activities (Diamond (1984)). Firms with long-term banking relationships may be less able (due to better monitoring) or less willing to jeopardize these valuable relationships by making opportunistic accounting choices. Accruals earnings management can also lead to an increase in cash taxes (Dyreng (2010)).[4] Thus, for certain firms, the costs of accruals management may outweigh the benefits of avoiding a covenant violation.

Firms have many earnings management tools to choose from (Beyer et al. (2010)). When accruals management is too costly, firms may prefer to engage in real earnings management activities instead (Cohen and Zarowin (2010), Gunny (2010)). Survey evidence in Graham et al. (2005) indicates that managers may in fact prefer real earnings management to accrual-based manipulation of earnings. The prior literature provides limited evidence that is consistent with covenant-related real earnings management. Bartov (1993) and Haw et al. (1991) use leverage as a proxy for covenant-based earnings management incentives. They find evidence consistent with firms timing assets sales and pension plan reversions in order to avoid covenant violations.

In summary, firms and managers have incentives to avoid the costs associated with debt covenant violations in undertaking earnings management activities. Accordingly, we make the following hypothesis:

Hypothesis 1: Firms undertake both real and accruals-based income increase earnings management activities in order to avoid violating debt covenants.

Prior research indicates that the magnitude of the expected violation costs will vary across firms (Smith (1993)). Chen and Wei (1993) find that some firms are granted unconditional waivers while others receive waivers only after agreeing to higher interest rates and/or additional

[4] Sweeney (1994) finds univariate (but not multivariate) evidence suggesting that firms are more likely to make income-increasing accounting changes in the years prior to a debt covenant violation. However, she finds that in the nine cases where a firm could have avoided a violation by switching inventory flow assumptions, four firms did not do so. She speculates that large negative tax consequences dissuaded them. This evidence suggests that firms balance the costs and benefits of covenant-induced earnings management.

covenants. Furthermore, these outcomes are associated with firm and loan characteristics. Consistent with this idea, Chava and Roberts (2008) find that investment reductions following covenant violations are concentrated in firms that have more severe agency problems or higher information asymmetry.[5] Similarly, Nini et al. (2009) find that creditors are more likely to limit the firm's investments when its credit risk has increased. Given that the expected violation costs vary across firms, the incentives to engage in covenant-related earnings management will likewise vary. Accordingly, we make the following hypothesis:

Hypothesis 2: Firms engage in relatively more (less) earnings management activities to avoid violating debt covenants when the expected costs of a violation are higher (lower).

3. Methodology

In this section, we discuss our research methodology and define the variables used in our tests. An important methodological choice regards whether to use annual or quarterly observations. While prior investigations into the Debt Covenant Hypothesis have often relied on firm-year observations (DeFond and Jiambalvo (1994), Kim et al. (2011)), several institutional factors suggest a finer analysis is preferred. Firms are (almost always) required to report their covenant compliance to lenders on a quarterly basis. Thus, firms' decisions to engage in earnings management to stay in compliance will be made on a quarterly basis. In addition, firms are required to disclose any covenant violations that have not been waived or amended as of the end of the fiscal quarter. Therefore, annual measures will contain measurement error and estimates of earnings management will be biased downwards to the extent incentives to management earnings are eliminated in the quarters immediately following a violation.[6] Dyreng (2010) finds that the average deal is no longer effective after eight quarters. Thus, in many cases, annual observations include quarters before the loan actually went into effect. To avoid these problems, we use quarterly observations.

3.1 Measuring accruals-based earnings management

[5] Demiroglu and James (2010) find that post-violation reductions in investment spending and net debt issuance vary with the initial level of tight slackness. Their results indicate that covenants are set tighter when the expected costs of a violation are lower.

[6] Consistent with this concern, DeFond and Jiambalvo (1994) find much weaker evidence of accruals management in the year of a covenant violation compared to during the previous year.

Following prior research, we use cross-sectional regression models estimated at the industry level (2-digit SIC code) to estimate discretionary accruals. The residual from these regressions are considered to be the portion of income not driven by economic fundamentals, but rather by managerial discretion. We use discretionary working capital accruals, *DWCA*, because nearly all income statement-based financial covenants are written on earnings before depreciation (Dyreng (2010)). Hence, firms gain little, or perhaps nothing at all, by managing earnings after depreciation.[7]

We use the modified Jones model, as recommended by Dechow et al. (1995), to estimate the expected level of discretionary working capital accruals. Following Louis and Robinson (2005), we estimate the model with quarterly data for every non-financial industry classified by its 2-digit SIC code. Following Kothari et al. (2005) and Collins et al. (2011), we control for performance (ROA) and sales growth (SG) in estimating discretionary accruals. Finally, following Kothari et al. (2005), we performance adjust our accruals measure to better isolate the proportion of discretionary accruals that are made in response to debt covenant pressures. Details of these procedures are provided in Appendix 1.

3.2 Measuring real earnings management

Following Roychowdhury (2006), we consider three proxies for real earnings management activities: the abnormal levels of cash flow from operations (CFO), production costs, and discretionary expenses. These measures have been used in several other studies, including Cohen et al. (2008). Details of their estimation are provided in Appendix 1.

1. Abnormal Cash Flows from Operations (*ACFO*): Firms can increase current period income by accelerating the timing of sales through additional price discounts or overly-lenient credit terms. Such actions will boost current period earnings as long as margins are positive. However, doing so will result in lower cash flows per dollar of sales. Thus, negative abnormal operating cash flows are interpreted as evidence of income-increasing real earnings management.

2. Abnormal Production Costs (*APROD*): As long as certain production costs are fixed in the short run, firms can lower cost of goods sold by increasing production. Increased

[7] We also examine whether non-working capital discretionary accruals are associated with incentives to avoid debt covenant violations. In untabulated tests, we find no evidence suggesting that firms manage non-working capital discretionary accruals in response to debt covenant pressures.

production spreads the same amount of fixed costs over a greater number of units, thus reducing the fixed costs per unit. Cost of goods sold (net income) will decrease (increase) as long as there are no offsetting increases in the variable costs per unit. Since the increase in total production costs is not offset by a proportional increase in sales, positive abnormal production costs are interpreted as evidence of income-increasing real earnings management.

3. Abnormal Discretionary Expenses (*AEXP*): Firms can increase current period income by reducing discretionary R&D and SG&A expenses. To the extent these expenses are paid for in cash, then reducing discretionary expenses will also boost current period cash flows. Thus, negative abnormal discretionary expenses are interpreted as evidence of income-increasing real earnings management.

In addition to these individual earnings management variables, we also analyze three summary measures to capture different types of earnings management. Following Zang (2007), we define *RM1* as the sum of *APROD* and -1**AEXP*. Similarly, we define *RM2* to be the sum of -1**ACFO* and -1**AEXP*. Higher values of both variables are interpreted as evidence of more income-increasing real earnings management. Finally, we define total earnings management (*TEM*) as the sum of *DWCA*, *APROD* and -1**AEXP*.[8]

3.3 Time series analyses

We expect incentives to engage in earnings management activities to avoid a debt covenant violation will be strongest during the quarters preceding a violation. Conversely, we expect covenant-related incentives are non-existent (or at least greatly reduced) after a violation occurs for two reasons. First, since the covenant was violated, there are no longer any incentives to avoid violating it. Second, after a violation occurs, creditors can exert a strong influence over the firm's operations (Nini et al. (2010), Roberts and Sufi (2009)). These creditors are unlikely to allow activities that are designed to prevent them from fully exerting their control rights and potentially reduce the value of collateral by engaging in costly real earnings management activities. Accordingly, we examine the amount of accrual and real earnings management in periods surrounding a debt covenant violation.

[8] We exclude *ACFO* from this definition to avoid potential double counting. For example, firms may offer more generous credit terms to boost sales. While doing so will cause *ACFO* to decrease, we expect that it might also cause *DWCA* to increase.

Our analysis is conducted in event time where the quarter in which the initial covenant violation is reported is designated as time t = 0. We exclude firms that had another covenant violation anytime during the preceding 4 quarters.[9] We aggregate the observations in event time for all firms with the necessary data and test whether the mean earnings management proxy in each quarter is significantly different from zero. These time-series analyses have two main advantages. First, it provides for powerful tests since the periods with relatively high (low) incentives to engage in earnings management activities can be precisely identified. Second, this approach avoids have to rely on noisy measures of debt covenant slack estimated using Compustat data (Dichev and Skinner (2002)). However, this approach also suffers from the same sample-selection issue that occurs in DeFond and Jiambalvo (1994) and Sweeney (1994) since none of these firms were ultimately successful in avoiding a violation. Our results will be biased to the extent that violation firms are systematically different from similar firms that were able to successfully avoid a violation using earnings management. For example, violation firms could have lower incentives to avoid a violation or less ability to engage in earnings management activities (Barton and Simko (2002)). Restricting the sample to firms that ultimately violated a covenant biases against rejecting the null hypothesis. This issue is most relevant during the quarter in which the violation occurred. Therefore, we focus on evidence of earnings management during the quarters prior to the debt covenant violation.

3.4 Cross-sectional analyses

In an alternative approach, we estimate covenant tightness to directly measure the incentives to engage in covenant-related earnings management activities for both violation and non-violation firms. We obtain information on debt covenants for private (bank) loans using data provided by Loan Pricing Corporation in the Dealscan database. Covenant tightness is measured using quarterly Compustat data for each firm with at least one of the following financial statement covenants: current ratio, interest coverage, quick ratio, EBITDA, debt to EBITDA, debt to equity, debt to tangible net worth, leverage, tangible net worth, and net worth. Following Dyreng (2010), we measure covenant tightness as the actual value of the covenant variable estimated using Compustat quarterly data less the covenant threshold obtained from Dealscan. The difference is scaled by the standard deviation of the actual value over the

[9] Results are qualitatively similar if we exclude firms with violations within the prior eight quarters.

previous eight quarters in order to make the covenant slack measures comparable across different types of covenants. However, the comparability across covenants could still be poor to the extent higher moment distributional characteristics (e.g. kurtosis) of the actual values vary across different types of covenants. To help mitigate this possibility, we rank each covenant type into deciles in the pooled sample. We then assume that covenants with a low rank in the pooled sample are comparable across covenants. Covenant tightness, *TIGHT*, is set equal to the decile rank of the tightest (lowest value) covenant. Only observations with positive values of tightness are included. While this measure is noisy, we expect that it will be correlated with the actual tightness of the firm's debt covenants. Excessive noise in the empirical estimate of *TIGHT* will bias against rejecting the null hypothesis.

We expect firms' incentives to engage in earnings management activities will be higher when debt covenants are tighter. To examine this hypothesis, we conduct cross-sectional regression analyses of the association between the relative tightness of the firm's covenants (*TIGHT*) and the earnings management activities using the "Tightness" sample discussed below.

Our basic regression model is as follows where *EM* represents the one of the earnings management proxies discussed above:[10]

$$EM_{i,t} = \alpha + \beta_1 TIGHT_{i,t} + \boldsymbol{\beta}_j Controls_{i,t} + \boldsymbol{\gamma}_k Industry_k + \boldsymbol{\lambda}_q Quarter + \varepsilon_{i,t} \quad (1)$$

Controls consists of a vector of the following variables that control for other determinants of earnings management activities that are unrelated to covenant tightness. ROA_t is the return on assets during quarter t. $SG_t = [(Sales_t/Sales_{t-4}) - 1]$ is the percentage growth in sales. *ROA* and *SG* control for performance and growth effects that are naturally associated with accruals, cash flows, production costs and discretionary expenses but are unrelated to covenant-related earnings management. *Tenure* measures the tenure of the firm's current auditor in years. *Big N* is an indicator variable that takes on a value of one if the firm's auditor is one of the Big N auditors, and zero otherwise. These two variables control for the intensity of auditor scrutiny and capture the costs of accruals management. M/B_t is the firm's market value of assets to book value of assets ratio measured at the end of quarter t and controls for growth opportunities. $Assets_t$

[10] Unlike the time-series tests, we do not have a natural control group to conduct the performance matching procedure. Thus, our earnings management proxies have not been performance adjusted for these analyses. Including *ROA* and *SG* as independent variables approximates the effects of the performance matching procedure.

controls for firm size and equals the natural logarithm of total assets at the end of quarter *t*. Finally, we include *Industry*, which is a vector of industry fixed-effects (two-digit SIC codes) and *Quarter*, which is a vector of quarterly time fixed-effects. We estimate equation (1) clustering the standard errors at the firm and quarter level (Petersen, 2009).

Barton and Simko (2002) argue that the aggregate amount of past accruals management leads to "balance sheet bloat" and limits future earnings management activities. This suggests that firms will engage in more real earnings management when accruals management in prior quarters has been higher. Therefore, we include an additional control variable, $AbsDTA_{t-1}$, in Eq. 1 when one of the real earnings management proxies is the dependent variable.[11,12] $AbsDTA_{t-1}$ is the absolute value total discretionary accruals during the prior quarter. $AbsDTA_{t-1}$ is estimated in a manner similar to how *DWCA* is estimated except that the dependent variable is total accruals (see Appendix 1 for details). Total accruals are defined as income before extraordinary items minus cash flow from operations, where both items are extracted from the cash flow statement.

One advantage of the cross-sectional approach is that we are able to analyze both violation and non-violation firms. Doing so allows us to avoid the sample selection issues the Violation sample suffers from. In addition, the regression framework allows us to control for other, non-covenant related determinants of earnings management beyond the *ROA* and *SG* performance matching procedure we implement in our time-series analyses. However, there are inherent errors in measuring slack with Compustat data since Dealscan does not provide the specific information about how the accounting variables the debt covenants are based on are defined (Dichev and Skinner (2002), Dyreng (2010)). Errors in measuring *TIGHT* will bias against the alternative hypothesis.

4. Samples and descriptive statistics

4.1 Violation sample

[11] Barton and Simko (2002) argue that NOA (net operating assets) reflects the cumulative amount of prior accrual earnings management and it captures the firm's ability to engage in additional accruals management. In untabulated analyses, we replace $AbsDTA_{t-1}$ with NOA_{t-1}, which is defined as the level of net operating assets scaled by total assets. The qualitative results and inferences remain unchanged. Also, the results are qualitatively unchanged when either $AbsDTA_{t-1}$ or NOA_{t-1} is measured at time *t*.

[12] Zang (2007) suggests that the managers have to make real earnings management decisions before accruals management decisions since these decisions take longer to implement. Therefore, we also include $RM1_t$ in the regressions where $DWCA_t$ is the dependent variable. In untabulated analyses, the qualitative results remain the same to the results tabulated below.

The Violation sample is based initial debt covenant violations reported by non-financial firms between 1996 and 2008. We focus on initial violations (meaning that the firm had no previous violations over the previous four quarters) because the incentives and ability of firms to engage in earnings management activities are diminished following a violation. The sample is obtained from Nini et al. (2010), who identify violations using text searches of 10-Qs and 10-Ks for all Compustat firms during the sample period.[13] If firms have "cured" the violation (or creditors have waived it) by the end of the fiscal quarter, then they are not required to report it. This discretion results in underreporting so that some non-violation observations are misclassified.

For each violation, we estimate the earnings management proxies using Compustat data. Due to different data requirements, the number of observations for the violation quarter (t = 0) varies across the different earnings management proxies from a high of 3,959 (for *ACFO*) to a low of 3,170 (for *TEM*). The sample size is also reduced as one moves forward or backwards in event time due to a type of reverse survivorship bias. In untabulated results, our inferences and qualitative results are unchanged if we limit the sample to firms with data available in all 12 quarters.

Descriptive statistics for the Violation sample are provided in Table 2, Panel A. The mean value ROA is -1.9% but the median value is 8.1%. Mean and median sales growth is positive (18.84% and 6.01%, respectively). In addition, the mean and median value of M/B are both above one (1.642 and 1.263, respectively). Thus, even though each firm eventually violates a covenant, the evidence indicates that they typically are not financially distressed. For descriptive purposes, we calculate *TIGHT* for the portion of the Violation sample that overlaps with Tightness sample described below (11,700 firm-quarter observations). For ease of interpretation, we report the raw (undeciled) values. The median value is 0.823, which indicates that the firm's tightest debt covenant ratio is less than one standard deviation above the violation point.

Correlations for the Violation sample are presented in Table 3, Panel A. Recall that positive (negative) values of *APROD* (*ACFO* and *AEXP*) are associated with income increasing real earnings management. Focusing on the Spearman correlations, the results for the earnings management proxies are interesting. *DWCA* is negatively correlated with *ACFO* (-0.65) and

[13] See the appendix in Nini et al. (2010) for details about the sample selection process.

positively correlated with *APROD* (0.09). In addition, *AFCO* is negatively correlated with *APROD* (-0.30) while *APROD* and *AEXP* are strongly negatively correlated (-0.49). These correlations indicate that firms tend to use each earnings management technique as compliments to the others. Finally, none of the earnings management proxies are strongly correlated with *TIGHT* (correlations range from 0.02 to -0.06)

4.2 Tightness sample

The Tightness sample is based on the Dealscan database, which consists of a large number private credit agreements obtained from SEC filings and sources that Loan Pricing Corporation has developed directly with lenders. The database contains information on interest rates, financial covenants, performance pricing grids, lenders, and loan maturities for both individual loans and groups of loans called packages or "deals".[14] We obtain financial statement data from Compustat.

Table 1 describes how the sample selection procedure affects the size of the sample. Firms in Dealscan are first matched to the Compustat quarterly files using GVKEY covering the sample period 1994 to 2008. Firms are eliminated if they are not corporations, are not "ultimate parents," where total assets never exceed $10 million during the loan period, or are foreign firms. Deals are excluded when there is insufficient data to calculate earnings management variables or the control variables. For each deal, we include all quarters where we expect the covenants recorded in Dealscan are in effect. Deal-quarters start with the earliest loan start date in the package and end with the earlier of either 1. the latest loan maturity date for deal, 2. a covenant is violated, or 3. Dealscan indicates that the terms of the loan have been renegotiated.[15] The final Tightness sample consists of 2,285 firms, 4,130 unique deals, and 15,382 deal-quarters.

Descriptive statistics for the Tightness sample are provided in Table 2, Panel B. The results show that the mean and median values of the earnings management proxies are quite different from their Panel A counterparts. These differences suggest that two samples are comprised of firms engaging in substantially dissimilar levels of earnings management on average. Consistent with the Tightness sample being dominated by non-violation firms, the

[14] The most primitive unit of observation in Dealscan is a "facility" which is an individual loan. We refer to groups of loans initiated at the same time and packaged together with a common set of covenants as "deals".
[15] We exclude quarters following a violation because Dichev and Skinner (2002) report that debt covenants do not appear to be binding after the first violation. While not all renegotiations involve changing debt covenant thresholds, we exclude post-renegotiation quarters in order to ensure that the covenants are in effect.

median value of *TIGHT* is much larger than in Panel A (3.038 vs. 0.823). The Tightness sample firms also have much higher ROA compared to the Violation sample firms (1.280 vs. 0.081).

Correlations for the Tightness sample are presented in Table 3, Panel B. Focusing on the Spearman correlations, the results show the correlations between the various earnings management proxies are similar to those in Panel A. The correlations between *TIGHT* and the earnings management proxies are likewise modest.

5. Results on the association between earnings management and debt covenants

In this section, we report our results on the association between earnings management and incentives to avoid debt covenant violations. We first present the results of our time-series tests using the Violation sample. We then present the results of our cross-sectional panel series regressions using the Tightness sample. Finally, we analyze how the expected costs of a violation affect the association between earnings management and debt covenant tightness.

5.1. Earnings management in the periods surrounding a debt covenant violation

Table 4 presents mean value of our earnings management proxies for quarters -8 to +3 where the violation occurs in quarter 0. We graphically present the means and medians for the same variables in Figures 1 – 5. We provide the medians as well because they are less likely than means to be influenced by extreme observations and measurement errors. However, the patterns and inferences are essentially unchanged using either measure.

Consistent with the distributional evidence provided in Dichev and Skinner (2002), we find strong evidence that firms engage in earnings management during the periods leading up to a violation. The results in Column A and Figure 1 indicate that firms engage in significant amounts of positive total earnings management for up to two years before the violation quarter. The magnitude of total earnings management is relatively stable during periods -8 to -5, then increases for the next two periods, and declines somewhat during periods -2 and -1 (although it is still significantly positive). Consistent with our expectations, we find no evidence that firms engage in earnings management during the violation quarter. This decrease is followed by a steady increase over the three post-violation periods. However, the post-violation magnitudes are much lower compared to the pre-violation values (roughly 40%). Overall, this pattern is consistent with Hypothesis 1: firms aggressively manage earnings upwards during the pre-

violation periods when the incentives to do so are the strongest. Firms effectively eliminate these activities in the violation quarter when they realize that further earnings management efforts are futile. These results strongly support those in Dichev and Skinner (2002), which are based on a different methodology and sample.

We next examine the unanswered question in Dichev and Skinner (2002): which types of earnings management activities do firms engage in. Overall, the evidence in column B and Figure 2 indicates that firms manage their earnings upwards using positive discretionary working capital accruals during the pre-violation periods. These results confirm and extend those in DeFond and Jiambalvo (1994). Using a small sample of 94 covenant violators, they find discretionary accruals are significantly positive in the year before the violation.

The pattern of discretionary accruals across event time is interesting and fits our expectations. Discretionary accruals become significantly positive in period t-7, peak in period t-4, and slowly decline through period t-1. In fact, the mean level of discretionary accruals is not significantly different from zero during period t-1. During the violation quarter, discretionary accruals strongly reverse and are significantly negative. They remain significantly negative during the three post-violation periods.[16] This pattern suggests that pressure from debt covenants cause firms to engage in accruals earning management for relatively long periods of time before the violation ultimately takes place. Furthermore, the decrease in the magnitude of accruals earnings management over the three periods preceding the violation is consistent with firms experiencing limitations in their ability to continually manage their working capital accruals upwards (Barton and Simko (2002)).[17]

Columns 3 – 5 of Table 4 and Figures 3 – 5 show that firms also engage in real earnings management activities during the pre-violation periods. Recall that negative values *ACFO* and *AEXP* are consistent with income-increasing earnings management. First, since all periods exhibit significantly negative levels of *ACFO*, it suggests that there may be systematic measurement error in our real earnings management proxy. Hence, we focus on the pattern of

[16] The lack of significant positive discretionary accruals in quarters t-1 and later provide one explanation regarding why the evidence in DeFond and Jiambalvo (1994) is weaker in the year of the violation. The reason is that the violation year generally combines quarters with significantly positive, significantly negative, and insignificant levels of discretionary accruals.

[17] Consistent with this explanation, we find that in untabulated results, net operating assets (NOA) increases until quarter t-2, remains roughly at the same level until quarter t+1, and then declines sharply.

ACFO over time. *ACFO* decreases over the periods t-8 to t-4, then stays at a fairly constant level through violation period, and then sharply increases over the post-violation periods. This pattern suggests that firms engage in real earnings management for several quarters prior to the violation quarter. Similar to the accruals earnings management results, the level of *ACFO* declines substantially after the violation period.

One notable difference between the *DWCA* and *ACFO* results is that while *DWCA* sharply reverses in the violation period, the amount of *ACFO* does not diminish until the period after the covenant violation. One reason for this might be due to the nature of this type of real earnings management. It may be that firms have to plan and commit to these activities for up to several months before the results appear in the financial statements. Thus, firms may be unable to quickly reverse these activities once a violation occurs during the quarter, and thus, the reversal does not appear until the subsequent quarter.

The pattern of abnormal production costs, *APROD*, follows a similar pattern to that of *ACFO*, except that the signs are reversed (as expected). *APROD* increases during the pre-violation periods, remains high during the violation period, and then declines sharply in the post-violation periods. Again, it appears that firms may not be able to quickly reverse these types of real earnings management activities and there is a one quarter delay in the reversal.

Table 4 Col. 5 and Figure 5 indicate that firms also engage in covenant-related real earnings management through the reduction of discretionary expenses, *AEXP*. The pattern in both the mean and median values is less smooth compared to the other earnings management proxies, perhaps due to relatively more measurement error. Nonetheless, the evidence indicates significant levels of positive earnings management in all pre-violation periods followed by a sharp reduction in the violation period. Interestingly, abnormal discretionary expenses become increasingly negative during the post-violations periods, although the median level remains less negative than in the pre-violation periods. We speculate that the post-violation pattern is due to expense reductions instigated on behalf of creditors, consistent with Nini et al. (2010).

In summary, the time-series evidence strongly indicates that firms engage in income increasing accrual and real earnings management in the periods before a debt covenant violation. It is during these periods when the incentives to engage in these activities are the strongest. These earnings management activities strongly reverse in the post-violation periods along with

the incentives to manage earnings.[18] In addition, Table 4 shows that while accruals management diminishes in the quarter before a violation, real earnings management activities remain significant and if anything, increase slightly. These patterns are consistent with firms using real activities to substitute for a diminishing ability to manage accruals in the quarters just prior to a violation.

5.2. Earnings management and debt covenant tightness

Table 5 presents the results of our cross-sectional panel series regressions (equation 1) using the Tightness sample. The dependent variable in the Column A regression is *TEM*, our total earnings management proxy. Hypothesis 1 predicts that firms will engage in more earnings management when debt covenants are tighter. The results strongly support this hypothesis as the *TIGHT* coefficient is positive and highly significant (p-value < 0.0001). This result is consistent with the distributional evidence in Dichev and Skinner (2002) that firms engage in earnings management activities in order to avoid violating debt covenants.

The results in Columns B – G provide evidence on what type of covenant-related earnings management activities firms engage in. The results in Column B show that the *TIGHT* coefficient is positive (as expected) and significant (p-value = 0.049). This finding suggests that firms with tighter debt covenants increase their earnings through managing their working capital accruals more than firms with looser debt covenants. These results provide large sample support for our hypothesis that firms engage in accruals earnings management in order to avoid violating debt covenants. As such, it strengthens and refines the small sample results in DeFond and Jiambalvo (1994).

In columns C and D, the dependent variable is one of the two aggregate real earnings management proxies, *RM1* and *RM2*, respectively. Recall that these variables are defined such that more positive values reflect more income-increasing real earnings management. For each measure, the *TIGHT* coefficient is positive and significant (p-values = 0.002 and 0.010, respectively). These results indicate that firms engage in significantly more real earnings management when debt covenants are tighter. These results suggest that on average, managers

[18] In addition, we find no evidence that firms engage in non-operating accruals management in the pre-violation periods (results not tabulated). Not finding evidence of earnings management activity which does not affect accounting-based debt covenants further supports our interpretation that the earnings management activity we document is in response to covenant-related pressures.

are willing to incur the costs associated with real earnings management in order to avoid a debt covenant violation.

In columns E – G, we examine the association between debt covenant tightness and our proxies for three specific types of real earnings management. Consistent with our expectations, the *TIGHT* coefficient is negative and significant (*p*-value = 0.006) when *ACFO* is the dependent variable. This finding is consistent with firms with tight covenants accelerating the timing of sales (which reduces *ACFO*) in order to increase current period income. Also as expected, the *TIGHT* coefficient is positive and significant (*p*-value < 0.001) when *APROD* is the dependent variable. This result suggests that firms with tight covenants increase production levels (which increases *APROD*) in order to increase current period income. Finally, the results in column G show that the coefficient on *TIGHT* is not significantly different from zero (*p*-value = 0.787) when *AEXP* is the dependent variable. One interpretation of this result is that firms are unwilling or unable to reduce discretionary expenses (SG&A and R&D) when debt covenants are tighter. For example, it could be that the costs of this type of earnings management are greater than the benefits and that firms choose to engage in other, less costly, earnings management activities. Another possibility is that excessive measurement error is responsible for the lack of significance.

In summary, we find strong evidence that firms engage in more earnings management when debt covenants are tighter. Extending the prior literature, our cross-sectional tests indicate that firms concurrently engage in both accruals and real earnings management in order to avoid violating a debt covenant. As such, our analyses extend the prior literature that only examines one type of earnings management (DeFond and Jiambalvo (1994), Kim et al. (2011)).

5.3. Expected violation costs and the association between earnings management and debt covenant tightness

Hypothesis 2 predicts that firms engage in relatively more (less) earnings management activities to avoid violating debt covenants when the expected costs of a violation are higher (lower). In order to test this hypothesis, we separately include four proxies for the expected costs of a debt covenant violation in Eq. 1 and also interact these proxies with *TIGHT*. We use the following variables to proxy for the expected costs of a covenant violation. *Credit Rating* is an indicator variable that equals one if the firm as a credit rating, and zero otherwise. *FC Index* is an index of financial constraints based on Whited and Wu (2006). *Big Syndicate* is an indicator

variable that equals one if the firm's lending syndicate contains five or more banks, and zero otherwise. *Cash Holdings* is an indicator variable that equals one if the firm's ratio of cash to total assets is in the top decile of the sample distribution, and zero otherwise. Based on the arguments in Chava and Roberts (2008), we expect that violation costs are lower for firms with a credit rating and with large lending syndicates (due to reduced information frictions) and are higher for more financially constrained firms and firms with larger cash balances (indicating greater agency problems).

The results from these augmented regressions are reported in Table 6 where the dependent variable is one of our seven earnings management measures. For the sake of brevity, we only report the results for the covenant tightness/expected violation cost interaction variables. Table 6 shows that the estimated interaction coefficients all have the predicted signs with one exception (*FC Index*TIGHT* when *RM2* is the dependent variable). However, only eight of the 28 coefficients are statistically significant at even marginal levels (one-sided p-values ≤ 0.103). The strongest results come when either *DWCA*, *RM1*, or *UPROD* is the dependent variable. In each of these cases, at least two of the interaction coefficients are statistically significant. Overall, we view these results as providing somewhat weak evidence supporting Hypothesis 2.

Two potential reasons for the relatively weak results are the following. First, it could be that our expected covenant violation cost proxies are relatively crude and weak, which reduces the power of our tests. Second, managers may have relatively stronger and more uniform incentives to avoid violating a covenant than the variation in our violation cost proxies implies. Nini et al. (2010) and Ozelge and Saunders (2011) find significantly higher forced CEO turnover rates following covenant violations. To the extent expected post-violation forced turnovers are not highly correlated with our violation cost proxies, managers will be more concerned about losing their positions rather than maximizing shareholder value and our tests will be of low power. In the next section, we explore this possibility that debt covenant-related earnings management represents an agency cost more fully.

6. Earnings management and post-violation performance

The analyses discussed above indicate that firms engage in both real and accruals-based earnings management activities in order to avoid violating debt covenants. Both types of activities are likely to be costly to firms. In addition, firms (and managers) experience costs

when they violate debt covenants in the form of higher interest rates, additional covenants, and reduced access to credit, among other things. Despite these violation costs, Nini et al. (2010) suggest that bank intervention following covenant violations is actually beneficial to firms as they reduce agency costs associated with entrenched managers. Based on this set of somewhat conflicting evidence, it is not clear whether shareholders prefer firms to engage in earnings management to avoid a covenant violation or not.

In this section, we address this question by examining the future accounting and stock market performance of four groups of firms: 1. Firms that are relatively close to a covenant violation but do not violate a covenant and do not engage in earnings management; 2. Firms that are relatively close to a covenant violation but do not violate a covenant but do engage in earnings management; 3. Firms that violate a covenant but do not engage in earnings management beforehand; and 4. Firms that violate a covenant but do engage in earnings management beforehand. This approach allows us to separate out the effects of a violation (which was examined in Nini et al. (2010)) from the effects of earnings management (which has not been done previously).

We compare the performance of each group over the next four quarters (12 months) after the violation quarter using both accounting and stock-return metrics. To compare accounting-based metrics, we examine the change in ROA (*ΔROA)*, along with the change in sales (*ΔSales*), change in operating expenses (*ΔOpExp*), change in SG&A expenses (*ΔSG&A*), change in other expenses (*ΔOthExp*), change in capital expenditures (*ΔCapX*), and the change in R&D expenses (*ΔR&D*). To compare stock performance, we use buy-and-hold abnormal returns (*BHAR*) measured over the following 12 months. *BHAR* is calculated by compounding the firm's return less the corresponding return from a portfolio created based on size and book to market over the twelve months following the violation quarter.

In order to isolate the effect of covenant violations and earnings management on future performance, we use propensity score matching to match each covenant violation firm-year observation with a non-violation observation that has a similar likelihood of violation. In the first stage of this process, we run the following logit regression:

$$Violation = f(constant, Size, Debt/Assets, Cash/Assets, SE, Current, D/EBITDA, IntCov, ROA, BM, SG, \textbf{Industry, Fiscal Quarter}) \quad (2)$$

where *Violation* equals one if the firm reported a covenant violation during the year, and zero otherwise. Violations are obtained from the Violation sample. Non-violation observations come from all available firm-year observations with the necessary data from the same 1994 – 2008 period. We constrain the non-violation group to only contain firms that report no covenant violation during our sample period. Overall, the sample consists of 50,697 firm-year observations that have the required data, including 1,825 observations with a covenant violation. Size equals the natural logarithm of total assets. *Debt/Assets* equals the ratio of total long-term debt + long-term debt in current liabilities to total assets. *Cash/Assets* equals the ratio of cash and equivalents to total assets. *SE* equals total shareholders' equity. *Current* equals the ratio of current assets to current liabilities. *D/EBITDA* equals long-term debt + long-term debt in current liabilities to EBITDA. *IntCov* equals the interest coverage ratio. *ROA* equals return on assets. *BM* equals the book to market ratio. *SG* equals sales growth. *Industry* is a vector of industry indicator variables based on Barth et al. (1999) and *Fiscal Quarter* is a vector of indicator variables based on whether the fiscal quarter is the 1st, 2nd, 3rd, or 4th fiscal quarter.

The untabulated results from estimating equation 2 indicate that model has reasonable explanatory power (pseudo R^2 = 14.7%). Each of the explanatory variables is significant with the exception of *D/EBITDA*, and the signs are all in the expected directions. Using the fitted values, we match each violation observation with a non-violation observation that is within the same industry. We use a procedure that is globally optimal in the sense that it minimizes the sum of the absolute distances across all matched pairs within an industry. In this way, pairs that match first are not necessarily better than pairs that match last. Rather, all pairs are matched simultaneously to minimize total match distance.

Univariate statistics for each of the 1,825 violation and control firms are provided in Table 7. There are a few things to note. First, the number of observations varies for each of the performance measures due to differences in data availability. Second, none of the mean values for the explanatory variables in equation 2 (below the dashed lines in each panel of Table 7) are significantly different between the violation and non-violation groups. This gives us confidence that the propensity score matching procedure has effectively controlled for these differences

between the two groups. Third, the mean values of each performance measure are significantly different between the violation and non-violation groups. Comparing the means indicates that while violation firms have higher growth in return on assets compared to non-violation firms, they have lower future abnormal returns. In addition, while future sales growth tends to be higher among the control firms, so are the expense growth rates.

We examine the differences in future accounting performance between the four groups using the following simple regression:

$$\Delta Performance_{t,t+4} = Intercept + \beta_1 * Violation_t + \beta_2 * EM_t + \beta_3 * Violation * EM_t + \varepsilon \qquad (3)$$

where *ΔPerformance* refers to one of the performance measures and measures the change in the measure over the next four quarters. *Violation* is an indicator variable that equals one if the firm reported a debt covenant violation during quarter *t*, and zero otherwise. *EM* represents one of our earnings management variables, which are discussed below. Thus, *Intercept* captures the average future performance of the non-violation, non-earnings management firms, β_1 for the violation, non-earnings management firms, β_2 for the non-violation firms that engaged in positive earnings management, and β_3 for the violation firms that engaged in positive earnings management.

In our first specification, we use *AEM* as our earnings management proxy, where *AEM* is an indicator variable that equals one if the value of $DWCA_t$ is in the top tercile of the empirical distribution, and zero if the value of $DWCA_t$ is in the bottom tercile. In our second specification, *REM* is the earnings management proxy, where *REM* is an indicator variable that equals one if the value of $RM1_t$ is in the top tercile, and zero if the value of $RM1_t$ is in the bottom tercile. We exclude firms in the middle tercile to increase the power of our tests (Lys and Sabino (1992)). The results of these regressions are presented in Table 8, Panels A and B, respectively.[19]

The results in Col. 1, Panel A indicate that among firms that do not manage earnings using accruals, future growth in ROA is significantly higher (0.64%, *t*-statistic = 4.21) for firms that violate debt covenants compared to non-violation firms. The results in Cols. 2 – 7 indicate the mechanisms through which this result occurs. Col. 2 shows that the higher growth in ROA is not

[19] Results are qualitatively similar if we either use continuous measures of earnings management (*DWCA*, *REM1*) or indicator variables based on whether *DWCA* (*REM1*) is greater than zero.

caused by more rapid sales growth (-5.25%, *t*-statistic = -4.79) among violation firms; indeed, such firms experience significantly lower sales growth compared to non-violation firms. Instead, the more rapid increase in ROA is due to more stringent cost controls among violation firms across almost every expense category. Compared to non-violation firms, violation firms experience significantly lower growth in operating expenses, SG&A expenses, other expenses, and capital expenditures; only R&D expenses are not significantly lower. The reduction in capital expenditures is especially noteworthy: the coefficient estimates imply that violation firms reduce their capital expenditures by over 7% (= 1.42% + (-8.48%)) whereas non-violation firms increase capital expenditures by 1.42%. Overall, these results are generally consistent with those in Nini et al. (2010), who attribute these differences to the beneficial effects of bank intervention.

The results in Col. 1 show that the *AEM* coefficient is negative and significant (*t*-statistic = -1.95). This result indicates that non-violation firms with positive accruals management experienced significantly lower growth in ROA compared to similar non-violation firms that had not previously engaged in accruals management (0.22% vs. 0.52%). The lower growth in ROA for accruals management firms is due to faster growth in certain expense categories (particularly SG&A) as there is no significant differences in sales growth between the two groups of firms.

Finally, the results in Panel A, Col. 1 show that the *Violation*AEM* coefficient is negative and significant (*t*-statistic = -3.19). The results indicate that firms that both violated a debt covenant and managed earnings upwards using discretionary accruals experience lower ROA growth compared to firms that did not manage earnings. These differences are driven by more rapid expense growth rather than by lower sales growth.

The tenor of the results in Panel B where we use real earnings management (*REM*) as the earnings management proxy is similar to that in Panel A. Violation firms experience faster ROA growth compared to non-violation firms. This is true both for earnings management firms (0.51% vs. 0.33%) and non-management firms (0.81% vs. 0.26%). In addition, violation firms that engaged in real earnings management experience lower ROA growth rates (0.81% vs. 0.51%).

However, unlike the AEM results, we do not find a significant difference in ROA growth for non-violation firms (0.33% vs. 0.26%).[20]

Overall, the results in Cols. 1 - 7 in Panels A and B of Table 8 are generally consistent with two things. First, firms engaging in earnings management have lower future accounting performance (percentage growth in ROA) compared to firms that did not engage in earnings management. This result holds regardless of whether the firm violated a debt covenant or not.[21] This suggests that firms suffer real future consequences from earnings management, even if the earnings management is accruals based. Second, covenant violations are associated with more rapid ROA growth, although the magnitude of this effect is generally larger for firms that did not engage in earnings management.

In the analyses discussed above, we document that firms systematically engage in earnings management in order to avoid debt covenant violations. However, they also indicate why shareholders may prefer their firms not to engage in earnings management. First, for firms at risk of violating a debt covenant, engaging in earnings management generally has a negative effect on future growth in ROA. Second, covenant violations are generally followed by faster ROA growth. In order to analyze investors' preferences more completely, we perform additional analyses where we compare *BHAR*, the buy and hold abnormal returns, across the four groups of firms. The results are presented in Col. 8 of Table 8 as well as in Figures 6 and 7.

The stock return results indicate covenant violators experience significantly worse returns stock performs compared to non-violators, irrespective of whether they engage in accruals or real earnings management or not.[22] This is in striking contrast to the generally positive affect that covenant violations have on future ROA. For example, violating a debt covenant is associated with 12.19% lower returns for accruals management firms and 9.40% lower returns for non-

[20] When we examine the effects of total earnings management, the untabulated results are qualitatively similar to the AEM results. Violation firms experience faster ROA growth compared to non-violation firms. In addition, total earnings management firms experience lower ROA growth rates.

[21] The one exception is that non-violation firms that engaged in real earnings management do not experience lower ROA growth compared to non-violation firms that did not engage in real earnings management.

[22] Our analyses assume that by the end of the quarter in which the violation occurs, information concerning the violation has already been incorporated into the stock price. However, to the extent the market remains uninformed until the 10-Q/10-K release date, it is possible that the differences in returns are driven by large negative announcement returns that occur after our post-violation period begins. However, the evidence in Figures 6 and 7 is not consistent with this explanation. Both figures show that returns for violation firms drift downwards for at least six (three) months after the returns period begins for earnings management (non-earnings management) firms.

accruals management firms. The magnitudes of the return differences are similar in Panel B (real earnings management).

The stock return results indicate that accruals management has a relatively small negative effect on returns. For violation firms, future returns are 3.28% lower for accruals management firms compared to non-accruals management firms. For non-violation firms, future returns are only 0.49% lower. In contrast, the results in Panel B indicate that real earnings management is associated with large negative abnormal returns. This finding holds for both violation firms and non-violation firms. The magnitudes of the coefficients suggest that violation firms engaging in real earnings management experience returns that are 10.68% (= -12.78% vs. -23.46%) lower than violation firms that did not engage in real earnings management activities. For non-violation firms, real earnings management is associated with 9.70% lower returns. In contrast, real earnings management is not associated with lower ROA growth for non-violation firms.

In summary, there are three main results from our stock return analyses. First, violation firms experience substantially worse returns (roughly 10%) over the 12 months following the violation quarter compared to similar firms that do not violate a debt covenant. Second, firms engaging in real earnings management experience substantially negative abnormal returns (roughly 10%) regardless of whether they violate a covenant or not. Third, returns for accruals management firms are only marginally lower than for non-accruals management firms. The differences between the real and accruals management results are consistent with intuition and prior assumptions made in the literature that real earnings management activities are more costly for shareholders than accruals management activities are.[23]

Nini et al. (2010) examine the effects of bank intervention following covenant violations. They find that bank intervention is associated with declines in acquisitions and capital expenditures, reductions in leverage and dividend/share repurchases, and an increase in forced CEO turnover. Using a different methodology from ours, they also find that violation firms experience higher growth in ROA compared to a broad sample on non-violation firms (which includes both firms that are close to a violation and firms that are highly unlikely to violate a

[23] Cohen et al. (2008) find that firm switched from accrual-based to real earnings management methods after the passage of the Sarbanes-Oxley Act in 2002. If our results, which are based on firms relatively close to debt covenants, are generalizable to a broader population of firms, then they suggest that the switch in earnings management methods after 2002 lead to lower shareholder returns, *ceteris paribus*.

covenant). However, unlike our results, they find weak evidence that violation firms experience more positive future returns during the 12 months following a violation.[24]

Our finding that abnormal returns are substantially lower for violation firms compared to a matched sample of firms that have a similar likelihood of a violation provides a very different interpretation of the effects of bank intervention after a covenant violation. The evidence from both papers indicates that bank intervention is associated with significant cost cutting and deleveraging. Together, these activities result in stronger, short-term accounting performance, which likely increases the firm's ability to repay its loans. However, the combination of lower sales growth, large reductions in capital expenditures and reduced (and more costly) access to loans suggests that this positive near-term accounting performance comes at the expense of lower future revenue growth and foregone positive NPV investment projects. In essence, banks impose actions on violation firms that increase the likelihood of repayment at the expense of shareholder value. Such bank-initiated actions and consequences are in-keeping with the banks' incentives and ability to intervene in the firm's operations following a covenant violation.

6.1. Survivorship bias

There is a survivorship bias concern associated with the accounting performance results discussed above to the extent that covenant violation firms have different likelihoods of survival compared to non-violation firms. To examine this issue, we examine the frequency with which violation and non-violation firms disappear from our sample. The results presented in Figure 7 indicate that by 12 months after the event date, more violation firms are lost (313) compared to non-violation firms (233).[25] These losses represent 20% and 16% of the respective sub-samples.

To provide additional evidence on this issue, we use CRSP delisting codes to examine why our sample firms to disappear. For non-violation firms, 42% delisted for performance reasons (codes 550-585) while 52% are delisted following a merger (codes 200-261). In comparison, 54% of violation firms are delisted while only 43% merge with another firm. To the extent that worse

[24] The difference between our findings and those in Nini et al (2011) are likely driven by differences in abnormal return methodologies and/or differences in control samples.

[25] It is unclear what role the banks play in the reduced likelihood of survival for violation firms. One possibility is that for weaker violation firms, bank actions reduce their chances of survival compared to similarly performing non-violation firms. Another explanation is that covenant violation firms have worse prospects compared to non-violation firms and bank actions are not associated with the likelihood of survival. We are unable to distinguish between these alternatives.

performing firms are more likely to be delisted, then this evidence further suggests that poorly performing violation firms are more likely to exit the sample compared to non-violation firms.[26] If so, then it suggests that the faster ROA growth for violation firms documented in Table 8 could be overstated to the extent better performing violation firms are more likely to remain in the sample. Thus, our accounting performance results need to be interpreted accordingly.

In order provide some evidence on the importance of any survivorship bias, we split the sample into two parts based on whether the firm reported an operating loss at time zero or not. The presence of a time 0 loss is strongly associated with the likelihood that the firm disappears from our sample. We find that 87.2% profit firms survive for at least the next four quarters while only 77.5% of the loss firms survive. Among firms with positive profits, violation firms are more likely to survive (88.6%) compared to the non-violation firms (85.3%). In contrast, among loss firms, 225 violation firms fail (23.2%) while only 140 non-violation firms fail (21.6%) (results untabulated).

We separately rerun the analyses in Table 8 on the profit and loss sub-samples. In untabulated results, our primary findings and interpretations remain the same when the sample is constrained to either profit or loss firms with two main exceptions. First, the *Violation* coefficient in the ΔROA regression with real earnings management is no longer significant (*t*-statistic = 1.23). Second, while the signs of the *Violation*EM* coefficients in the ΔROA regressions remain negative, they are no longer significant. Thus, while we find that covenant violation affects survivorship, we find that our accounting performance results are generally invariant to potential survivorship bias.

7. Summary and conclusions

In this paper, we provide new, large sample evidence regarding the association between earnings management and debt covenants. Using both time-series and cross-sectional tests, we find strong evidence that firms engage in earnings management activities in order to avoid violating covenants. In doing so, we provide additional support for the Debt Covenant Hypothesis. More importantly, we provide evidence on the important question left open by Dichev and Skinner (2002) regarding which types of covenant-related earnings management

[26] Nini et al. (2010) also document that violation firms are less likely to survive than non-violation firms, although the rates and differences in the rates are smaller than we document here. Demiroglu and James (2010) find that covenant violations are significant predictors of firm failure.

activities firms engage in. Our tests show that both real and accruals earnings management techniques are used in response to debt covenant pressures. Additionally, the correlations among the various techniques indicate that firms use them as complements, not substitutes.

We extend the Debt Covenant Hypothesis literature by examining whether the covenant-related earnings management activities are associated with the expected costs of a violation. We use various proxies for the expected costs of a violation taken from the prior literature. Overall, these analyses provide weak evidence that firms engage in relatively more (less) earnings management when the expected violation costs are higher (lower). One explanation is that since managers are more frequently fired following covenant violations, they have strong incentives to avoid violating a covenant even when shareholders' expected violation costs are low.

In the last section of our paper, we provide evidence on whether shareholders benefit when firms engage in costly earnings management activities in order to avoid violating a debt covenant. These analyses are based on matching covenant violation firms with non-violation firms that have a similar likelihood of covenant violation. We generally find that covenant violation firms experience significantly higher growth in ROA. Our results are consistent with banks imposing increased cost discipline on firms, including large reductions in capital expenditures, that more than offsets lower sales growth. In contrast, we find that violation firms experience substantially worse returns (roughly 10%) over the 12 months following a violation quarter compared to similar firms that do not violate a debt covenant. Overall, our results suggest that bank intervention following covenant violations may change the operations of the firm in a way that is suboptimal for equity holders.

We also find that firms engaging in real and accruals-earnings management generally experience significantly slower growth in return on assets over the next four quarters. In addition, firms engaging in real earnings management experience substantially negative abnormal returns (roughly 10%) regardless of whether they violate a covenant or not. However, abnormal returns for accruals management firms are only marginally lower than for non-accruals management firms. These results suggest that shareholders incur substantial costs when their firms engage in real earnings management activities in order to avoid debt covenant violations. These results add to the small number of studies (Bhojraj et al. (2009), Cohen and Zarowin (2010), and Gunny (2010)) that have examined the costs to shareholders of earnings management.

Appendix 1: Estimation of earnings management proxies

In this appendix, we provide a detailed discussion of how our various earnings management proxies are estimated.

Discretionary working capital accruals (*DWCA*): Our regression model in equation A1.1 below is based on the modified Jones model, as recommended by Dechow et al. (1995). Following Louis and Robinson (2005), we estimate the model with quarterly data for every non-financial industry classified by its 2-digit SIC code. Thus, our approach partially controls for industry-wide changes in economic conditions that affect working capital accruals and allows the coefficients to vary across time (Cohen and Zarowin (2010)). To reduce measurement errors, we use working capital accruals obtained from the Statement of Cash Flows (Hribar and Collins (2002).

The likelihood of a covenant violation is negatively associated with firm performance. Firms with poor performance likely have incentives to manage earnings upwards that are unrelated to debt covenants. To address this issue, we follow Kothari et al. (2005) and Collins et al. (2011) and control for performance (ROA) and sales growth (SG) in estimating discretionary accruals. This latter adjustment stems from the fact that commonly used Jones-type discretionary accrual models applied in quarterly settings do not adequately control for nondiscretionary working capital accruals that naturally occur due to firm growth. Our performance-matched accrual earnings management measure allows us to isolate the incentive effects of debt covenants.

Our primary model for estimating discretionary working capital accruals is based on the following cross-sectional model estimated for each 2 digit SIC-fiscal quarter grouping as follows:

$$\frac{WCA_{it}}{Assets_{i,t-1}} = \sum_{j=0}^{3} k_j \frac{Q_{t-j}}{Assets_{i,t-j-1}} + k_5 \frac{\Delta Sales_{i,t} - \Delta AR_{i,t}}{Assets_{i,t-1}} + \varepsilon_{i,t} \qquad \text{(A1.1)}$$

where *i* indexes firms, *t* indexes fiscal quarters, and *WCA* represents working capital accruals, which are defined as $WCA_{it} = -$ (CHGAR + CHGINV + CHGAP + CHGTAX + CHGOTH). The acronyms inside the parentheses in this expression represent the changes in accounts receivable, inventories, accounts payable, taxes payable, and other items.[27] $Asset_{i,t-1}$ represents lagged total assets, $\Delta Sales_{it}$ is the change in revenues from the preceding quarter, and $\Delta A/R_{it}$ is the change in accounts receivable from the preceding quarter. Q_j is an indicator variable taking the value 1 in quarter j and 0 otherwise. All variables, including the quarterly intercepts are

[27] Notice that a positive (negative) value of CHGAR and CHGINV represents a decrease (increase) in accounts receivable and inventories, while a positive (negative) value of CHGAP, CHGTAX, and CHGOTH represents an increase (decrease) in accounts payable, taxes payable, and other items. These variables are referred to as RECCHY, INVCHY, APALCHY, TAXCHY, and AOLOCHY in the current version of Compustat. Like Collins et al. (2011), we recode missing values of RECCHY, INVCHY, APALCHY, and TAXCHY as zero if there is a nonmissing value of AOLOCHY. Conversely, if AOLOCHY is missing but the other items are not missing, then we recode AOLOCHY as zero. We undo the year-to-date nature of these quarterly cash flow statement items and compute the quantities for the quarter under consideration.

deflated by total assets at the beginning of the quarter.[28] Every fiscal quarter, we estimate model (1) for each 2-digit SIC code industry with all the necessary Compustat data. In addition, we impose a minimum of 15 observations per regression and having total assets in excess of $10 million.

The residuals from the above specification are adjusted for like residuals from firms matched on ROA and sales growth (SG) and comprise our proxy for discretionary working capital accruals, $DWCA_{it}$. To perform the ROA and SG adjustment, we first split the sample into two subsamples: the treatment sample that contains firms that report a debt covenant violation during the sample period, and a control subsample consists of firms that never report a violation during the sample period (more details on sample selection below). Next, we arrange all same-industry treatment firms during quarter t-4 into five ROA quintiles and choose the matching control firm that has the closest SG from quarter t-4 to t in the relevant quintile and industry. We calculate ROA as the net income divided by total assets, and SG as the sales during quarter t divided by sales during quarter t-4 minus one. A similar procedure is used to adjust the residuals from equations A2.2, A2.3, and A2.4 below.

Abnormal cash flow from operations (*ACFO*): Following Roychowdhury (2006), we express the normal level of CFO as a linear function of sales and change in sales. To estimate this model, we run the following cross-sectional regression for each industry/fiscal year:

$$\frac{CFO_{it}}{Assets_{i,t-1}} = \sum_{j=1}^{4} k_j \frac{Q_j}{Assets_{i,t-1}} + k_5 \frac{Sales_{i,t}}{Assets_{i,t-1}} + k_6 \frac{\Delta Sales_{i,t}}{Assets_{i,t-1}} + \varepsilon_{i,t} \qquad \text{(A1.2)}$$

ACFO is set equal to actual CFO minus the normal level of CFO calculated using the estimated residuals from equation A1.2. CFO is cash flow from operations, defined as the difference from the following Compustat quarterly data items: (ΔOANCFY – ΔXIDOCY).[29] The rest of items are as defined above. More negative values *ACFO* are associated with more income increasing real earnings management.

Abnormal production costs (*APROD*): Production costs are defined as the sum of costs of goods sold and the change in inventory during the quarter. Following Roychowdhury (2006), production costs are modeled as a linear function of contemporaneous sales and of contemporaneous and lagged changes in sales. To estimate this model, we run the following cross-sectional regression for each industry/fiscal year:

$$\frac{PROD_{it}}{Assets_{i,t-1}} = \sum_{j=1}^{4} k_j \frac{Q_j}{Assets_{i,t-1}} + k_5 \frac{Sales_{i,t}}{Assets_{i,t-1}} + k_6 \frac{\Delta Sales_{i,t}}{Assets_{i,t-1}} + k_7 \frac{\Delta Sales_{i,t-1}}{Assets_{i,t-1}} + \varepsilon_{i,t} \qquad \text{(A1.3)}$$

[28] The traditional modified-Jones model for total accruals includes an additional regressor: gross property, plant and equipment. We drop this term because our dependent variable is working capital accruals, which are not affected by this item. Our inferences are not affected by this choice.

[29] We undo the year-to-date nature of these quarterly cash flow statement items to compute the quantities for the quarter under consideration.

The residuals from equation A1.3 are our estimate of abnormal production costs. More positive values of *APROD* are associated with more income increasing real earnings management.

Abnormal discretionary expenses (*AEXP*): The normal level of discretionary expenses can be expressed as a linear function of sales. However, modeling discretionary expenses as a function of current sales creates a mechanical problem if firms manage sales upwards to increase reported earnings in a certain year, resulting in significantly lower residuals from running a regression of discretionary expenses on current sales. To address this issue, we model discretionary expenses as a function of lagged sales and estimate the following model for each industry/fiscal year to derive the normal level of discretionary expenses:

$$\frac{DEXP_{it}}{Assets_{i,t-1}} = \sum_{j=1}^{4} k_j \frac{Q_j}{Assets_{i,t-1}} + k_5 \frac{Sales_{i,t}}{Assets_{i,t-1}} + \varepsilon_{i,t} \qquad \text{(A1.4)}$$

Discretionary expenses (DEXP) are defined as the sum of quarterly SG&A and R&D expenses.[30] The residuals of this model are our estimate of abnormal discretionary expenses. More negative values of *AEXP* are associated with more income increasing real earnings management.

[30] Roychowdhury (2006) includes advertising expenses as part of discretionary expenses. We exclude advertising because it is not reported in quarterly Compustat data.

Table 1: Selection Criteria for the Tightness sample

	Firms	Deals	Deal-quarters
Dealscan observations with matching GVKEY between 1994 and 2008	6,869	27,001	N/A
Excluding firms that are not organized as corporations (e.g. LLC, LP, Trust)	6,767	26,594	N/A
Excluding foreign firms and firms that are not "ultimate parents"	5,874	22,677	N/A
Excluding deals where more than one deal becomes effective on the same date	5,815	21,544	N/A
Excluding deals with no financial covenants	4,181	10,328	N/A
Excluding deals where assets in Compustat are always less than $10 million	4,105	10,168	N/A
Excluding deals with no Compustat data in the quarter ended nearest to but greater than 90 days from the effective contract date	3,811	9,259	N/A
Excluding deals with no Compustat data during the estimated active contract period	3,326	6,702	32,664
Excluding deals with insufficient Compustat data to compute *SLACK*	2,928	5,556	25,797
Excluding deals with insufficient Compustat data to compute discretionary accruals.	2,554	4,668	18,116
Excluding deals with missing control variables	2,285	4,130	15,382

Table 2a: Descriptive statistics for the Violation sample

NAME	N	MEAN	STD	P25	P50	P75
DWCA	38,289	-0.022	5.994	-3.051	0.002	2.989
ACFO	40,528	-1.060	6.887	-4.652	-0.998	2.523
APROD	38,903	1.466	9.419	-3.209	1.072	5.932
AEXPQ	35,744	-0.908	7.817	-4.609	-0.518	2.916
RM1	38,634	-0.007	0.118	-0.063	-0.008	0.048
RM2	39,400	-0.000	0.078	-0.039	-0.000	0.038
TEM	32,206	2.358	17.531	-7.065	1.767	11.556
TIGHT	11,700	1.342	3.370	-0.475	0.823	2.651
ROA	41,751	-1.935	6.720	-2.527	0.081	1.195
SG	41,751	18.843	63.294	-8.914	6.014	26.558
ASSETS	41,751	5.059	1.622	3.799	4.855	6.077
M/B	41,677	1.642	1.214	0.995	1.263	1.800
NOA	41,653	0.619	0.215	0.519	0.672	0.773
BIG N	41,751	0.816	0.387	1.000	1.000	1.000
TENURE	41,751	1.636	0.900	1.099	1.609	2.303

Table 2b: Descriptive statistics for the Tightness sample

NAME	N	MEAN	STD	P25	P50	P75
DWCA	14,699	0.445	2.959	-1.090	0.315	1.935
ACFO	15,531	0.834	3.628	-1.173	1.015	2.920
APROD	15,283	-1.253	5.520	-4.373	-1.321	1.562
AEXPQ	14,445	0.611	4.729	-2.265	-0.038	3.220
RM1	14,157	-2.071	9.683	-7.488	-1.524	3.663
RM2	14,430	-1.387	6.183	-4.925	-1.162	2.229
TEM	13,381	-2.171	10.808	-8.435	-1.528	4.027
TIGHT	16,410	4.142	3.843	1.502	2.996	5.374
ROA	16,410	0.953	3.706	0.386	1.287	2.299
SG	16,410	17.759	44.025	0.084	9.911	23.611
ASSETS	16,410	6.154	1.724	4.871	6.143	7.328
M/B	15,904	1.880	1.286	1.157	1.484	2.116
NOA	16,361	0.629	0.184	0.545	0.666	0.758
BIG N	16,410	0.902	0.297	1.000	1.000	1.000
TENURE	16,410	1.916	0.900	1.386	1.946	2.565
ABSTDA	15,393	2.943	3.442	0.826	1.844	3.701
LAG_ABSTDA	14,841	2.900	3.378	0.821	1.833	3.673

DCWA equals discretionary working capital accruals and is estimated according the procedure described in Appendix A. *ACFO* equals abnormal cash flow from operations and is estimated according the procedure described in Appendix A. *APROD* equals abnormal production expenses and is estimated according the procedure described in Appendix A. *AEXP* equals abnormal discretionary expenses and is estimated according the procedure described in Appendix A. *TIGHT* is the deciled rank of the tightest covenant and takes on values ranging from 0 to 9. Covenant

tightness is measured as the actual value of the covenant estimated using Compustat quarterly data less the covenant threshold obtained from Dealscan scaled by the standard deviation of the actual value over the previous eight quarters. $SG_t = [(Sales_t/Sales_{t-4}) - 1]$ is the percentage growth in sales. *ROA* is the quarterly return on assets. *Tenure* measures the tenure of the firm's current auditor in years. *Big N* is an indicator variable that takes on a value of one if the firm's auditor is one of the Big N auditors, and zero otherwise. *M/B* is the firm's market value of assets to book value of assets ratio measured at the end of the quarter. *Assets* equals the natural logarithm of total assets at the end of the quarter. *NOA* equals the value of net operating assets scaled by total assets at the end of the quarter.

Table 3a: Violation sample correlation matrix (Pearson above and Spearman below diagonal)

NAME	*DWCA*	*ACFO*	*APROD*	*AEXPQ*	*RM1*	*RM2*	*TEM*	*TIGHT*	*ROA*	*SG*	*ASSETS*	*M/B*	*NOA*	*BIG N*	*TENURE*
DWCA		-0.67*	0.10*	0.02*	0.03*	0.31*	0.39*	0.03*	0.17*	0.06*	0.02*	0.04*	-0.04*	0.01*	-0.00
ACFO	-0.65*		-0.31*	-0.14*	-0.07*	-0.40*	-0.34*	-0.00	0.06*	-0.04*	-0.03*	-0.02*	0.08*	-0.02*	0.01*
APROD	0.09*	-0.30*		-0.46*	0.65*	0.45*	0.80*	0.02	-0.02*	0.03*	0.01	-0.07*	0.02*	-0.03*	0.00
AEXPQ	0.03*	-0.11*	-0.49*		-0.57*	-0.50*	-0.74*	-0.01	-0.12*	0.01	0.11*	0.09*	-0.08*	0.11*	0.00
RM1	0.02*	-0.07*	0.60*	-0.54*		0.78*	0.65*	0.01	0.06*	-0.00	-0.04*	-0.19*	0.13*	-0.10*	0.01*
RM2	0.30*	-0.38*	0.44*	-0.45*	0.76*		0.62*	-0.00	0.05*	-0.01	-0.06*	-0.16*	0.07*	-0.11*	-0.01
TEM	0.36*	-0.34*	0.78*	-0.71*	0.59*	0.58*		0.04*	0.22*	0.05*	-0.05*	-0.08*	0.04*	-0.07*	0.00
TIGHT	0.06*	-0.01	0.03*	-0.02*	0.01	-0.01	0.07*		0.21*	-0.03*	0.08*	0.05*	-0.03*	0.01	0.06*
ROA	0.15*	0.06*	-0.00	-0.08*	0.02*	-0.01*	0.16*	0.34*		0.05*	0.16*	-0.07*	0.12*	0.00	0.08*
SG	0.08*	-0.04*	0.04*	0.01	-0.01	-0.02*	0.06*	0.08*	0.28*		0.02*	0.20*	-0.01	0.01	-0.08*
ASSETS	0.03*	-0.04*	0.01*	0.13*	-0.06*	-0.07*	-0.06*	0.05*	0.12*	0.06*		-0.10*	0.04*	0.32*	0.18*
M/B	0.05*	-0.03*	-0.05*	0.08*	-0.18*	-0.14*	-0.06*	0.14*	0.12*	0.24*	-0.05*		-0.32*	0.02*	-0.06*
NOA	-0.04*	0.10*	-0.01	-0.06*	0.10*	0.04*	0.02*	-0.08*	0.06*	0.03*	0.04*	-0.32*		-0.06*	0.02*
BIG N	0.01*	-0.02*	-0.02*	0.10*	-0.10*	-0.10*	-0.06*	0.02*	0.01	0.00	0.34*	0.02*	-0.05*		0.25*
TENURE	-0.00	0.02*	0.01	0.01	0.02*	-0.01	0.00	0.08*	0.07*	-0.06*	0.18*	-0.06*	0.00	0.23*	

Table 3b: Tightness sample correlation matrix (Pearson above and Spearman below diagonal)

NAME	*DWCA*	*ACFO*	*APROD*	*AEXPQ*	*RM1*	*RM2*	*TEM*	*TIGHT*	*ROA*	*SG*	*ASSETS*	*M/B*	*NOA*	*BIG N*	*TENURE*	*ABSTDA*	*LAG__ABSTDA*
DWCA		-0.73*	0.14*	0.02*	0.07*	0.42*	0.37*	-0.03*	0.09*	0.13*	-0.05*	0.05*	-0.05*	-0.03*	-0.03*	0.06*	0.06*
ACFO	-0.69*		-0.37*	-0.01	-0.21*	-0.58*	-0.42*	0.06*	0.27*	-0.03*	0.02*	0.15*	0.13*	-0.00	0.02*	-0.09*	-0.09*
APROD	0.11*	-0.35*		-0.63*	0.92*	0.75*	0.90*	-0.01	-0.17*	0.03*	0.02	-0.28*	-0.01	-0.05*	-0.00	0.03*	-0.01
AEXPQ	0.03*	-0.01	-0.65*		-0.87*	-0.77*	-0.81*	-0.02	-0.13*	0.05*	0.05*	0.28*	-0.20*	0.12*	0.01	0.09*	0.05*
RM1	0.05*	-0.20*	0.92*	-0.87*		0.84*	0.94*	-0.01	-0.02*	-0.01	-0.03*	-0.31*	0.10*	-0.10*	-0.01	-0.03*	-0.03*
RM2	0.38*	-0.56*	0.76*	-0.74*	0.83*		0.92*	-0.02*	-0.05*	-0.03*	-0.05*	-0.31*	0.08*	-0.10*	-0.02*	-0.02*	0.01
TEM	0.33*	-0.40*	0.89*	-0.80*	0.93*	0.91*		-0.02*	0.01	0.03*	-0.03*	-0.27*	0.08*	-0.09*	-0.01	-0.01	-0.01
TIGHT	-0.03*	0.07*	-0.01	-0.01	-0.02*	-0.04*	-0.02*		0.11*	-0.10*	0.29*	0.00	-0.05*	0.06*	0.13*	-0.09*	-0.09*
ROA	0.09*	0.31*	-0.26*	-0.01	-0.14*	-0.17*	-0.10*	0.18*		0.05*	0.11*	0.17*	0.04*	-0.00	0.08*	-0.25*	-0.06*
SG	0.16*	0.01	0.00	0.02*	-0.00	-0.03*	0.04*	-0.08*	0.25*		-0.07*	0.23*	-0.03*	0.00	-0.08*	0.03*	0.05*
ASSETS	-0.05*	0.01	0.02*	0.08*	-0.05*	-0.06*	-0.05*	0.29*	0.06*	-0.04*		-0.05*	-0.07*	0.31*	0.25*	-0.22*	-0.23*
M/B	0.07*	0.17*	-0.31*	0.24*	-0.30*	-0.30*	-0.26*	0.08*	0.47*	0.30*	0.06*		-0.29*	0.05*	-0.03*	0.06*	0.06*
NOA	-0.05*	0.13*	-0.01	-0.15*	0.09*	0.07*	0.07*	-0.11*	-0.08*	-0.01	-0.12*	-0.26*		-0.08*	-0.01	-0.10*	-0.12*
BIG N	-0.02*	-0.01	-0.04*	0.11*	-0.10*	-0.09*	-0.09*	0.06*	0.02*	0.01	0.31*	0.07*	-0.09*		0.24*	-0.07*	-0.07*
TENURE	-0.04*	0.02*	0.00	0.01	-0.01	-0.01	-0.00	0.16*	0.07*	-0.07*	0.27*	-0.00	-0.03*	0.22*		-0.06*	-0.07*
ABSTDA	0.05*	-0.07*	0.02*	0.03*	-0.00	0.01	0.02	-0.09*	-0.03*	0.01	-0.25*	0.02*	-0.10*	-0.07*	-0.06*		0.27*
LAG_ABSTDA	0.05*	-0.07*	-0.00	0.02	-0.01	0.03*	0.01	-0.10*	0.00	0.02*	-0.25*	0.03*	-0.10*	-0.08*	-0.07*	0.25*	

Variable definitions are provided in Table 2.

Table 4: Accrual-based and real earnings management proxies around debt covenant violations

Event Time	(A) Total Earnings Management (TEM)	(B) Discretionary Working Capital Accruals (DWCA)	(C) Abnormal Cash Flow from Operations (ACFO)	(D) Abnormal Production Costs (APROD)	(A) Abnormal Discretionary Expenses (AEXP)
-8	3.050***	0.129	-0.820***	1.542***	-1.311***
	(8.38)	(1.09)	(-5.97)	(8.15)	(-8.21)
-7	3.303***	0.252**	-1.035***	1.695***	-1.237***
	(9.24)	(2.12)	(-7.97)	(9.21)	(-7.81)
-6	2.953***	0.354***	-1.132***	1.431***	-1.069***
	(8.61)	(3.17)	(-9.32)	(8.14)	(-6.85)
-5	2.882***	0.329***	-1.179***	1.464***	-0.872***
	(8.81)	(3.15)	(-9.81)	(8.54)	(-5.94)
-4	3.724***	0.473***	-1.390***	1.882***	-1.032***
	(11.07)	(4.33)	(-11.29)	(10.74)	(-6.86)
-3	3.633***	0.346***	-1.301***	1.898***	-1.229***
	(11.61)	(3.35)	(-10.77)	(11.68)	(-8.76)
-2	2.706***	0.206*	-1.399***	1.559***	-0.774***
	(8.74)	(2.03)	(-12.28)	(9.61)	(-5.48)
-1	3.096***	0.089	-1.365***	1.839***	-0.899***
	(10.67)	(0.92)	(-12.34)	(11.88)	(-6.76)
0	1.608***	-0.779***	-1.316***	1.889***	-0.318**
	(5.32)	(-7.38)	(-11.50)	(11.37)	(-2.34)
1	1.294***	-0.392***	-0.884***	0.889***	-0.545***
	(4.41)	(-3.86)	(-7.95)	(5.78)	(-4.08)
2	1.806***	-0.384***	-0.804***	1.194***	-0.787***
	(5.96)	(-3.63)	(-6.93)	(7.57)	(-5.74)
3	1.731***	-0.359***	-0.539***	0.889***	-1.033***
	(5.72)	(-3.49)	(-4.64)	(5.62)	(-7.46)

* (**) [***] implies significant at the 5% (1%) [0.1%] level, respectively.
Quarter t=0 is the fiscal quarter for which the initial covenant violation is reported. *TEM* equals the sum of *DWCA* and *APROD* and -1**AEXP*. Other variable definitions are provided in Table 2.

Figure 1: Total Earning Management (*TEM = DWCA + APROD* -1**AEXP*)

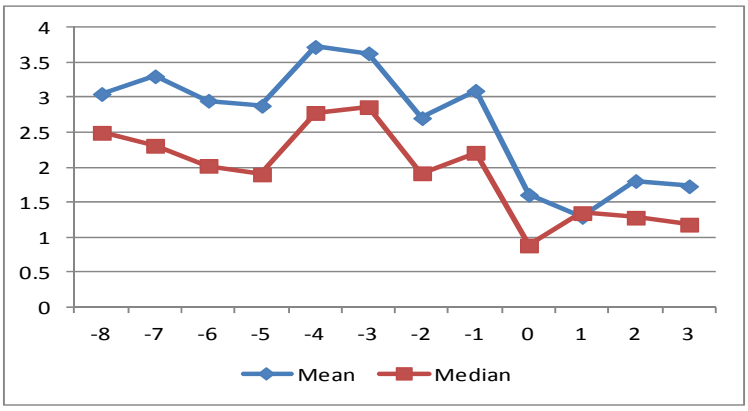


Figure 2: Discretionary Working Capital Accruals

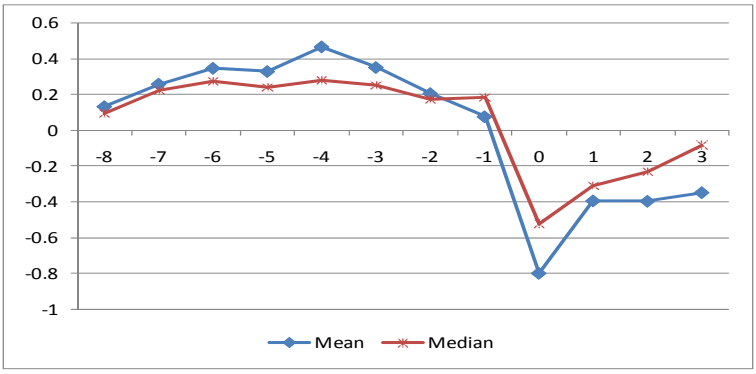


Figure 3:Abnormal Cash Flow from Operations (ACFO)

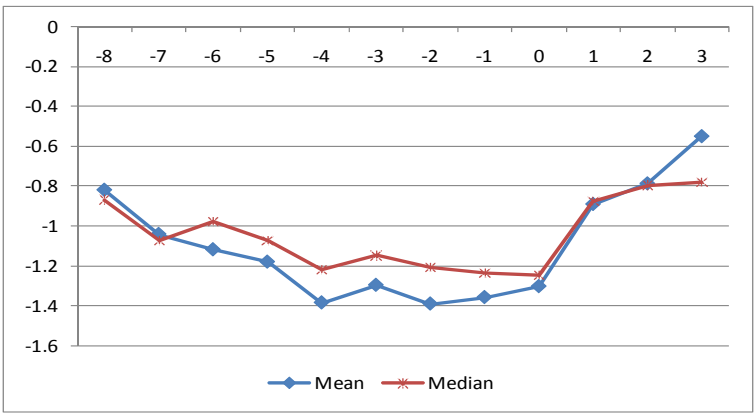


Figure 4: Abnormal Production Costs (APROD)

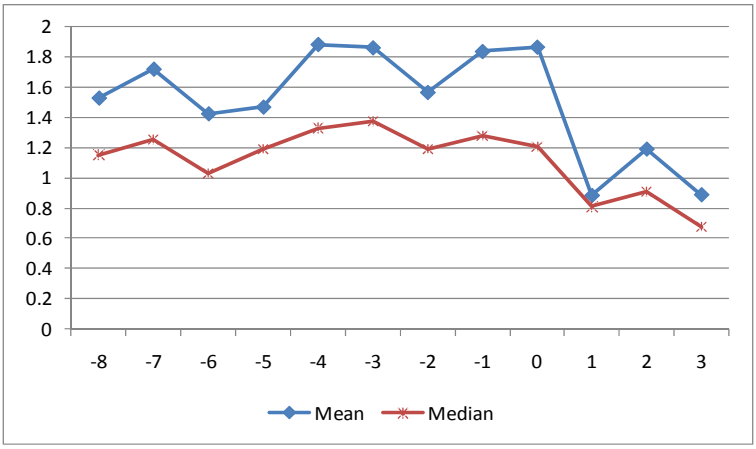


Figure 5: Abnormal Discretionary Expenses (AEXP)

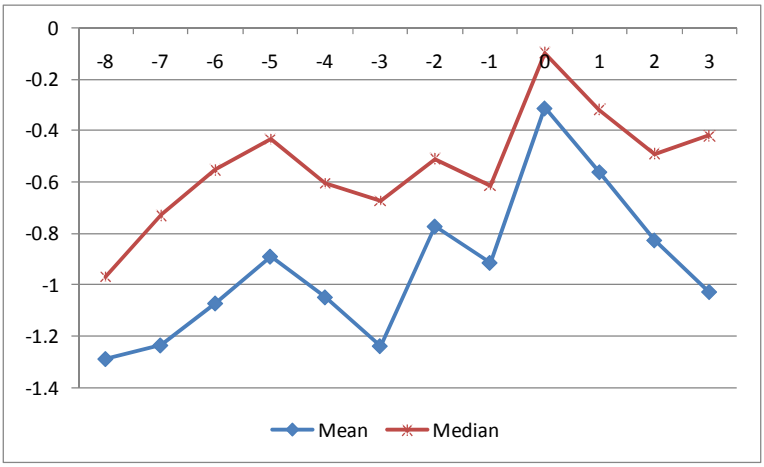


Table 5: Association between covenant tightness and earnings management

	(A) TEM	(B) DWCA	(C) RM1	(D) RM2	(E) ACFO	(F) APROD	(G) AEXP
Expected Sign of *TIGHT*	(+)	(+)	(+)	(+)	(-)	(+)	(-)
TIGHT	0.109***	0.041**	0.055*	0.066***	-0.062***	0.068***	8.235
	(3.07)	(2.67)	(1.92)	(3.04)	(-3.50)	(3.27)	(-0.04)
ROA	-0.004	0.105***	-0.131***	-0.089***	0.154***	-0.198***	8.143***
	(-0.10)	(5.54)	(-3.57)	(-3.12)	(7.00)	(-7.81)	(-3.67)
SG	0.012***	0.009***	0.004*	0.000	-0.003**	0.005***	7.540*
	(4.37)	(7.02)	(1.73)	(0.13)	(-2.25)	(3.12)	(1.96)
TENURE	-0.034	-0.022	-0.053	-0.056	0.068	-0.039	9.126
	(-0.21)	(-0.36)	(-0.42)	(-0.63)	(0.92)	(-0.43)	(0.38)
BIG N	0.070	0.021	-0.299	0.318	-0.245	-0.296	8.497
	(0.12)	(0.08)	(-0.59)	(0.76)	(-0.88)	(-1.01)	(0.12)
M/B	-0.021	0.120*	-0.171	-0.145	0.161**	-0.151**	7.869
	(-0.15)	(1.98)	(-1.47)	(-1.65)	(2.37)	(-2.19)	(0.14)
ASSETS	0.642	0.183	0.409	0.079	-0.407**	0.689***	7.081**
	(1.62)	(1.27)	(1.13)	(0.34)	(-2.27)	(3.27)	(2.54)
AbsDTA			-0.005	0.016	-0.004	-0.038**	7.809*
			(-0.23)	(0.69)	(-0.20)	(-2.16)	(-1.92)
N	13,742	14,963	13,270	13,535	14,417	14,087	13,538
Adjusted RSQ	0.784	0.222	0.877	0.729	0.411	0.774	0.906

Firm and quarter fixed-effects are included in the regressions but are not tabulated. Reported robust *t*-statistics in parentheses below the coefficients are based on standard errors clustered at the firm level. * (**) [***] implies significant at the 10% (5%) [1%] level, respectively. *RM1* equals the sum of *APROD* and -1**AEXP*. *RM2* equals the sum of -1**ACFO* and -1**AEXP*. Other variable definitions are provided in Tables 2 and 4.

Table 6: Expected violation costs and the association between earnings management and debt covenant slack

Interaction of *TIGHT* and	(A) **TEM**	(B) **DWCA**	(C) **RM1**	(D) **RM2**	(E) **ACFO**	(F) **APROD**	(G) **AEXP**
Predicted sign	-	-	-	-	+	-	+
Credit Rating	-0.099	-0.039*	-0.08	-0.035	0.019	-0.056*	0.004
p-value	[0.103]	[0.097]	[0.102]	[0.346]	[0.475]	[0.090]	[0.839]
Predicted sign	+	+	+	+	-	+	-
FC Index	0.051	0.046*	0.019	-0.009	-0.002	0.023	0.022
p-value	[0.428]	[0.087]	[0.698]	[0.817]	[0.937]	[0.503]	[0.287]
Predicted sign	-	-	-	-	+	-	+
Big Syndicate	-0.107	-0.011	-0.116**	-0.059	0.007	-0.080**	0.01
p-value	[0.142]	[0.666]	[0.047]	[0.155]	[0.811]	[0.046]	[0.692]
Predicted sign	+	+	+	+	-	+	-
Cash Holdings	0.127**	-0.003	0.084*	0.04	-0.021	0.086***	-0.003
p-value	[0.033]	[0.901]	[0.067]	[0.280]	[0.477]	[0.005]	[0.894]

Firm and quarter fixed-effects are included in the regressions but are not tabulated. Reported robust *t*-statistics based on standard errors clustered at the firm and quarter level. *p*-values are provided in brackets below the corresponding coefficients. * (**) [***] implies significant at the 10% (5%) [1%] level, respectively.

Credit Rating is an indicator variable that equals one if the firm as a credit rating, and zero otherwise. *FC Index* is an index of financial constraints based on Whited and Wu (2006). *Big Syndicate* is an indicator variable that equals one if the firm's lending syndicate contains five or more banks, and zero otherwise. *Cash Holdings* is an indicator variable that equals one if the firm's ratio of cash to total assets is in the top decile of the sample distribution, and zero otherwise. Other variables definitions are in Tables 2 and 4. Each regression includes the same explanatory variables that are included in Table 5 along with one of the four violation cost proxies (*Credit Rating*, *FC Index*, *Big Syndicate*, or *Cash Holdings*) along with its interaction with *TIGHT*. Only the results for the interaction terms are reported.

Table 7: Summary statistics for violation and control observations

Violation Firm-Years:

Name	N	Mean	StdDev	P25	P50	P75
Δ*ROA*	1,545	0.009***	0.060	-0.008	0.005	0.024
Δ*SALES*	1,562	0.033***	0.271	-0.098	0.042	0.159
Δ*OPEXP*	1,501	0.013***	0.255	-0.112	0.025	0.145
Δ*SG&A*	1,505	0.013***	0.228	-0.109	0.014	0.132
Δ*OTHEXP*	1,463	0.020***	0.278	-0.119	0.030	0.149
Δ*R&D*	688	-0.025**	0.205	-0.078	0.000	0.057
Δ*CAPX*	1,446	-0.082***	0.497	-0.340	-0.052	0.161
BHAR	1,571	-0.056***	0.832	-0.466	-0.162	0.154
LNASSETS	1,825	5.044	1.592	3.769	4.858	6.140
DEBT/ASSETS	1,825	0.348	0.207	0.187	0.328	0.474
CASH/ASSETS	1,825	0.068	0.102	0.010	0.030	0.079
EQUITY	1,825	211.721	702.526	13.949	46.053	156.852
CURRENT RATIO	1,825	1.771	1.205	1.039	1.477	2.145
DEBT/EBITDA	1,825	7.501	31.101	-3.345	7.963	19.006
INTEREST COVERAGE	1,825	2.025	25.138	-1.509	1.881	4.952
ROA	1,825	0.005	0.041	-0.012	0.015	0.029
B/M	1,825	0.715	1.118	0.338	0.630	1.101
SG	1,825	0.055	0.289	-0.103	0.027	0.185

Control Firm-Years:

Name	N	Mean	StdDev	P25	P50	P75
Δ*ROA*	1,621	0.003	0.050	-0.007	0.002	0.014
Δ*SALES*	1,622	0.073	0.259	-0.053	0.065	0.194
Δ*OPEXP*	1,560	0.064	0.236	-0.051	0.057	0.177
Δ*SG&A*	1,558	0.039	0.214	-0.060	0.037	0.143
Δ*OTHEXP*	1,502	0.072	0.246	-0.054	0.059	0.178
Δ*R&D*	742	-0.001	0.194	-0.043	0.000	0.054
Δ*CAPX*	1,503	0.021	0.463	-0.200	0.006	0.246
BHAR	1,478	0.048	0.839	-0.342	-0.065	0.227
LNASSETS	1,825	5.015	1.736	3.474	4.896	6.362
DEBT/ASSETS	1,825	0.349	0.228	0.177	0.313	0.481
CASH/ASSETS	1,825	0.071	0.106	0.011	0.031	0.087
EQUITY	1,825	232.445	693.572	10.958	43.386	180.541
CURRENT RATIO	1,825	1.771	1.138	1.032	1.518	2.205
DEBT/EBITDA	1,825	7.984	27.021	-0.852	7.253	16.275
INTEREST COVERAGE	1,825	1.235	40.650	-1.138	2.681	7.193
ROA	1,825	0.007	0.049	-0.009	0.021	0.036
B/M	1,825	0.757	0.864	0.283	0.571	0.988
SG	1,825	0.062	0.272	-0.065	0.052	0.176

Δ indicates the change in the corresponding variable over the next four quarters. ROA equals the return on assets. *SALES* equals total revenues. *OPEXP* equals operating expenses. *SG&A* equals selling, general, and administrative expenses. *OTHEXP* equals other expenses. *CAPX* equals capital expenditures. *R&D* equals research and development expenses. *BHAR* equals buy-and-hold abnormal returns measured over the following 12 months. Specifically, *BHAR* is calculated by compounding the firm's return less the corresponding return from a portfolio created based on size and book to market over the twelve months following the month of violation. LNASSETS is the natural log of total assets. *DEBT/ASSETS* equals the ratio of total long-term debt + long-term debt in current liabilities to total assets. *CASH/ASSETS* equals the ratio of cash and equivalents to total assets. *EQUITY* equals total shareholders equity. *CURRENT RATIO* equals the ratio of current assets to current liabilities. *DEBT/EBITDA* equals long-term debt + long-term debt in current liabilities to *EBITDA*. *INTEREST COVERAGE* equals the interest coverage ratio. Other variables are defined in Table 2.

Table 8: Association between covenant violations, earnings management, and future accounting performance

Panel A: Accruals Earnings Management (Upper tercile vs. lowest tercile)

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)
Dep. Variable	ΔROA	ΔSALES	ΔOPEXP	ΔSG&A	ΔOTHEXP	ΔR&D	ΔCAPX	BHAR
	%	%	%	%	%	%	%	%
INTERCEPT	0.520***	7.352***	5.400***	2.172**	6.054***	-0.860	1.422	-10.608***
	(4.31)	(8.86)	(5.26)	(2.59)	(6.67)	(-1.34)	(1.01)	(-5.31)
VIOLATION	0.636***	-5.254***	-7.255***	-3.576***	-7.246***	0.497	-8.479***	-9.404***
	(4.21)	(-4.79)	(-6.29)	(-4.61)	(-5.82)	(0.62)	(-4.55)	(-4.45)
AEM	-0.298*	-0.017	1.640	3.960***	0.550	1.733*	-1.815	-0.493
	(-1.95)	(-0.02)	(1.59)	(5.10)	(0.53)	(1.86)	(-0.93)	(-0.20)
*VIOLATION*AEM*	-0.603***	1.034	3.127*	0.193	3.399*	-1.350	-0.764	-2.784
	(-3.19)	(0.62)	(1.87)	(0.18)	(1.94)	(-1.08)	(-0.30)	(-1.09)
NOBS	2,083	2,089	2,008	2,010	1,940	974	1,922	1,996
RSQ	0.017	0.014	0.030	0.025	0.024	-0.000	0.019	0.019
F-Tests								
No Violation/No AEM	0.520***	7.352***	5.400***	2.172**	6.054***	-0.860	1.422	-10.608***
	(4.31)	(8.86)	(5.26)	(2.59)	(6.67)	(-1.34)	(1.01)	(-5.31)
Yes Violation/No AEM	1.155***	2.098*	-1.855	-1.405	-1.192	-0.362	-7.057***	-20.012***
	(9.81)	(1.82)	(-1.56)	(-1.51)	(-0.95)	(-0.56)	(-5.11)	(-11.00)
No Violation/Yes AEM	0.222**	7.335***	7.039***	6.132***	6.604***	0.874	-0.392	-11.101***
	(2.30)	(5.99)	(6.20)	(9.59)	(6.42)	(1.15)	(-0.23)	(-5.11)
Yes Violation/Yes AEM	0.255***	3.115***	2.912***	2.748***	2.758***	0.021	-9.636***	-23.289***
	(2.92)	(3.41)	(3.18)	(3.86)	(2.92)	(0.03)	(-7.41)	(-11.17)

Reported *t*-statistics based on robust standard errors. *p*-values are provided below the corresponding coefficients. Coefficients are expressed as a percentage for ease of exposition. *F*-tests and significance levels refer to F-tests regarding the whether the sum of the corresponding coefficients are different from zero. *Violation* is an indicator that equals one if the firm violates a covenant, and zero otherwise. *AEM* is an indicator variable that equals one if the value of *DWCA* is in the top tercile of the distribution, and zero if *DWCA* is in the bottom tercile of the distribution. Observations in the middle tercile of the distribution are excluded from the regression.

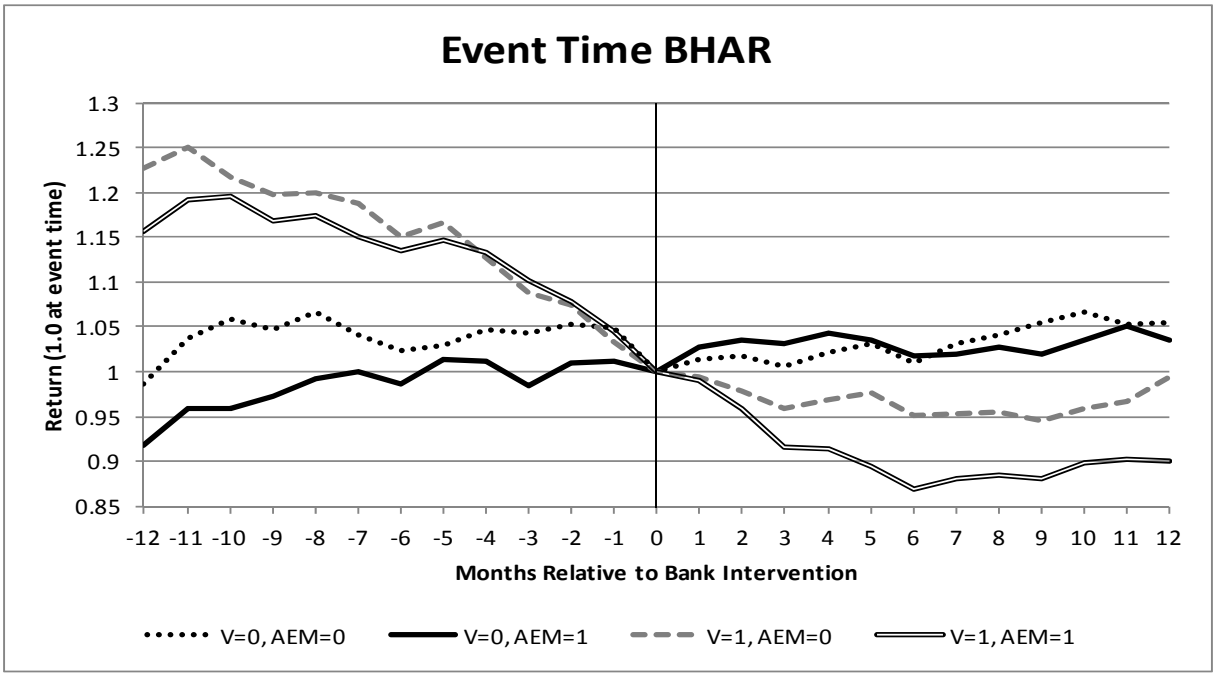
Table 8 Panel B: Real Earnings Management (Upper tercile vs. lowest tercile)

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)
Dep. Variable	ΔROA	ΔSALES	ΔOPEXP	ΔSG&A	ΔOTHEXP	ΔR&D	ΔCAPX	BHAR
	%	%	%	%	%	%	%	%
INTERCEPT	0.258***	7.993***	7.030***	5.566***	7.369***	0.412	4.049***	-4.069**
	(3.48)	(8.20)	(6.96)	(6.84)	(8.48)	(0.65)	(2.78)	(-2.07)
VIOLATION	0.547***	-2.305**	-4.237***	-4.575***	-3.661***	0.282	-9.882***	-8.712***
	(4.18)	(-2.20)	(-4.06)	(-4.22)	(-3.61)	(0.36)	(-6.06)	(-4.02)
REM	0.076	-2.314**	-2.624**	-2.871***	-2.755***	-0.025	-3.047*	-9.704***
	(0.56)	(-2.20)	(-2.58)	(-3.09)	(-2.72)	(-0.04)	(-1.71)	(-3.78)
*VIOLATION*REM*	-0.372**	-1.781	1.016	2.931**	0.235	-1.100	2.921	-0.973
	(-2.16)	(-1.52)	(0.74)	(2.18)	(0.18)	(-1.27)	(1.30)	(-0.27)
NOBS	2,108	2,126	2,045	2,033	1,963	978	1,958	1,992
RSQ	0.005	0.016	0.015	0.014	0.014	-0.002	0.017	0.032
F-Tests								
No Violation/No REM	0.258***	7.993***	7.030***	5.566***	7.369***	0.412	4.049***	-4.069**
	(3.48)	(8.20)	(6.96)	(6.84)	(8.48)	(0.65)	(2.78)	(-2.07)
Yes Violation/No REM	0.805***	5.688***	2.793***	0.991	3.707***	0.693	-5.833***	-12.781***
	(7.19)	(7.44)	(2.90)	(1.12)	(3.89)	(1.04)	(-4.43)	(-7.52)
No Violation/Yes REM	0.334***	5.679***	4.406***	2.695***	4.614***	0.387	1.002	-13.773***
	(3.11)	(5.37)	(4.32)	(3.32)	(4.39)	(0.92)	(0.72)	(-5.99)
Yes Violation/Yes REM	0.510***	1.593***	1.185***	1.051***	1.187***	-0.432	-5.959***	-23.458***
	(4.39)	(1.66)	(1.29)	(1.44)	(1.34)	(-0.72)	(-3.74)	(-11.68)

Reported *t*-statistics in parentheses below the coefficient estimate are based on robust standard errors clustered by firm and quarter. Coefficients are expressed as a percentage for ease of exposition (i.e. multiplied by 100). *F*-tests and significance levels refer to F-tests regarding the whether the sum of the corresponding coefficients are different from zero.

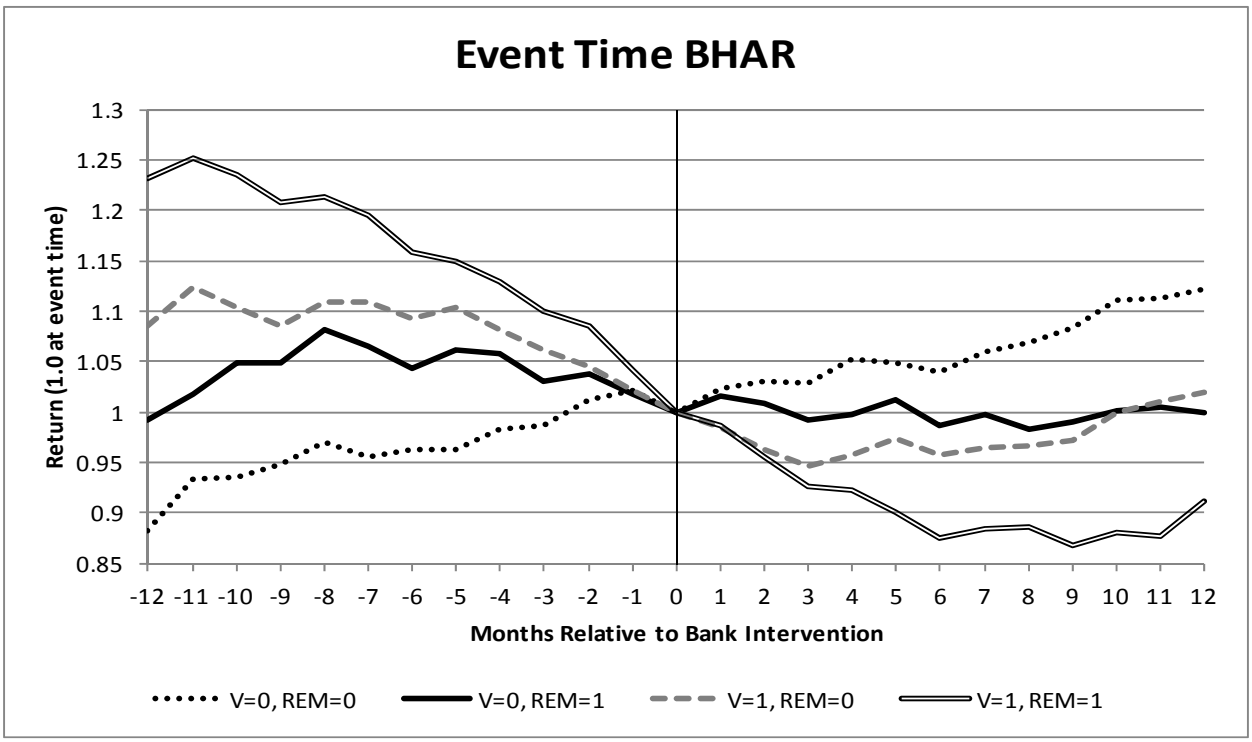
Violation is an indicator that equals one if the firm violates a covenant, and zero otherwise. *REM* is an indicator variable that equals one if the value of *RM1* is in the top tercile of the distribution, and zero if *RM1* is in the bottom tercile of the distribution. Observations in the middle tercile of the distribution are excluded from the regression.

Figure 6: Buy-and-hold returns depending on covenant violations and accrual earnings management



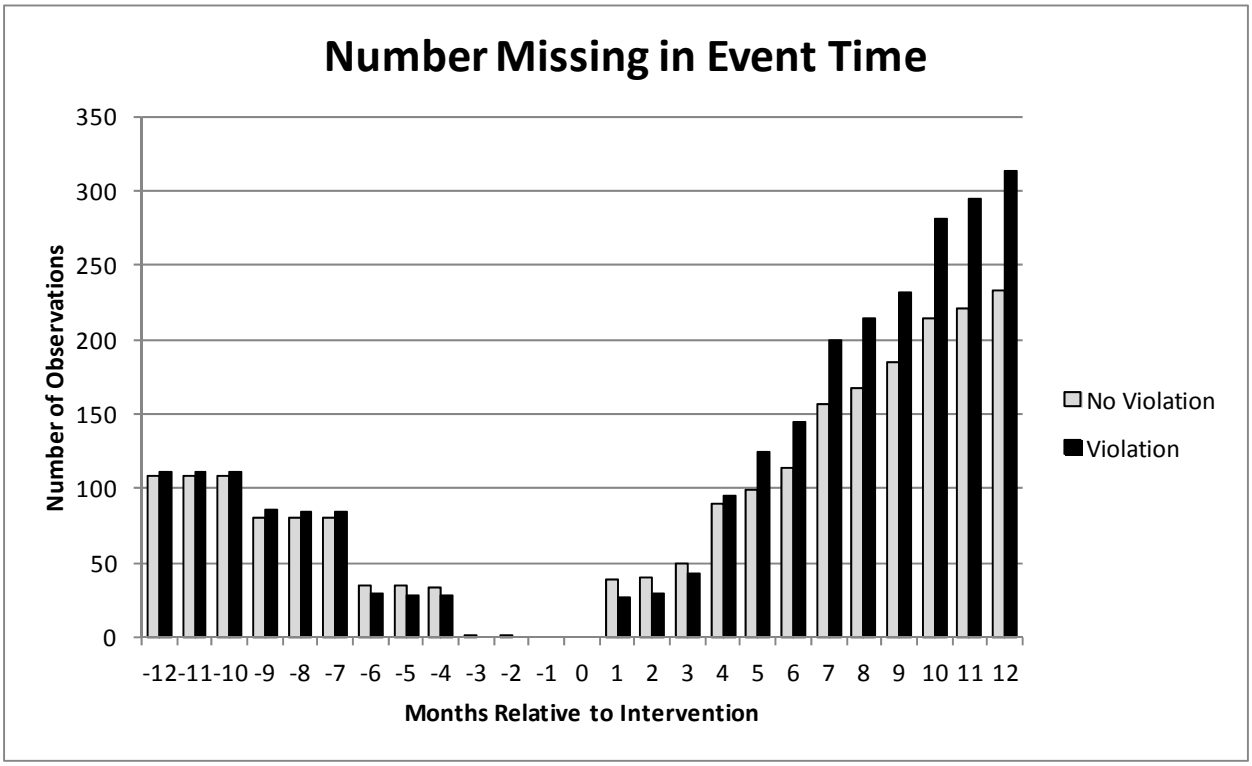
The figure represents buy and hold portfolios, hypothetically formed at month 0, then followed forward or backward in event-time. Returns are adjusted for delisting values available in CRSP. The proceeds after the delisting are assumed to be reinvested in the corresponding risk adjusted portfolio, such that abnormal returns are zero.

Figure 7: Buy-and-hold returns depending on covenant violations and real earnings management



The figure represents buy and hold portfolios, hypothetically formed at month 0, then followed forward or backward in event-time. Returns are adjusted for delisting values available in CRSP. The proceeds after the delisting are assumed to be reinvested in the corresponding risk adjusted portfolio, such that abnormal returns are zero.

Figure 7: Number of Missing Firms in Event Time



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