The Market Response to Implied Debt Covenant Violations

Derrald E. Stice  
Department of Accounting  
School of Business and Management  
Hong Kong University of Science & Technology

July 2010

Keywords: technical default, debt covenant violation, private lending agreements

I thank Dan Amiram, Gary Biddle, Dane Christensen, Ted Christensen, Mark DeFond, Mike Drake, Scott Dyreng, Mark Maffett, Eric Press, Kay Stice, Jake Thornock, Chris Williams, and Yoonseok Zang for helpful comments and discussions. I appreciate comments and suggestions from workshop participants at the 2010 Brigham Young University Accounting Symposium, 2010 University of Miami Rookie Camp, Melbourne Business School/University of Melbourne Conference, Chinese University of Hong Kong, Hong Kong University of Science & Technology, McGill University, Pennsylvania State University, University of Hong Kong, University of North Carolina at Chapel Hill, and the University of Southern California.

Address for correspondence: Department of Accounting, School of Business and Management, Hong Kong University of Science & Technology, Clear Water Bay, Kowloon, Hong Kong. Phone: 852-2358-7556. Email: acstice@ust.hk.
Previous research documents a negative stock price reaction to the announcement of debt covenant violations. However, not all covenant violations are disclosed because firms are able to obtain covenant violation waivers and renegotiate debt contracts with their lenders before being required to disclose a violation in the financial statements. Exploiting the fact that over half of all private debt contracts contain a debt covenant based on some variation of accounting earnings, I construct a sample of firms with debt contracts that contain at least one earnings-based covenant. Combining earnings-based-covenant contract values with information publicly available, I construct a measure of implied debt covenant violation and find evidence that investors are able to price the likelihood of an earnings-based debt covenant violation on the earnings announcement date. Furthermore, I find no evidence of a negative stock price reaction to the disclosure of a debt covenant violation when there was a high likelihood of such a violation implied by previously-reported earnings. These results suggest that the total cost of debt covenant violations in the cross-section is higher than estimated in the previous literature.
I. Introduction

Prior research demonstrates there is a negative stock price reaction to the public disclosure of debt covenant violations in quarterly (10-Q) and annual (10-K) financial reports (see e.g., Beneish and Press 1995a). However, because firms are able to obtain covenant violation waivers and renegotiate debt contracts with their lenders, not all covenant violations are necessarily disclosed. Demerjian (2011) documents a recent trend in debt contracts of a decreased use of balance-sheet-based covenants and a high prevalence of income-statement-based covenants, with over half of all debt contracts containing a covenant based on some variant of accounting earnings. Given that most publicly-traded firms make a preliminary announcement of earnings several weeks before the SEC filing date, I investigate whether the market is able to use the information in the earnings announcement to price the likelihood of an earnings-based debt covenant violation (hereafter DCV) and the extent to which this reaction at the earnings announcement date reduces the stock price impact of a subsequent disclosure of a covenant violation.

I find evidence of a significant negative price reaction on earnings announcement dates when realized earnings imply a high likelihood of an earnings-based debt covenant violation. I also find no significant price response to the disclosure of a debt covenant violation on SEC filing dates for firms that previously reported earnings that implied a high likelihood of a debt covenant violation. These results complement and extend the findings of prior studies that report negative stock price reactions to the announcement of DCVs and suggest that the total costs of debt covenant violations in the cross-section are higher than previously estimated.

---

1 SEC Regulation S-X states that “any breach of covenant which exists at the date of the most recent balance sheet filed and which has not been subsequently cured shall be stated in the notes to the financial statement (SEC 1988).” [Emphasis added.]
Beneish and Press (1993) estimate that the average costs of a DCV attributable to increased interest rates and renegotiation fees are between one and two percent of the market value of equity for their sample of firms that disclose a covenant violation. In a subsequent study, Beneish and Press (1995a) investigate the stock price reaction to a DCV disclosure. They find that announcements of technical default of debt covenants are associated with a significant -3.52% return in the three-day period surrounding announcements of debt covenant violation and that 60% of these announcements occur on the SEC filing date of the 10-K or NT 10-K. The fact that the majority of DCV violations are disclosed on SEC filing dates suggests that managers tend to wait until the latest possible date under SEC regulations to reveal the existence of an unresolved technical default.\(^2\)

Because earnings are announced, on average, several weeks before financial statements are officially submitted to the SEC (see Alford et al. 1994); it is possible that new information about possible earnings-based DCVs becomes available to investors well before the firm officially acknowledges the violations in an SEC filing. Consistent with this possibility, Nini et al. (2012) report that returns are significantly negative in the months leading up to and including the SEC filing date for firms that disclose DCVs. I argue that if new information about the likelihood of DCV is revealed in announced earnings, then returns will be decreasing in a measure of that likelihood on the date of an earnings announcement. Furthermore, to the extent that this measure is positively correlated with disclosed DCVs, I expect that the negative price response to subsequent DCV disclosures typically observed on to the SEC filing date will be attenuated.

\(^2\) Using a sample of recent covenant violations, Griffin et al. (2012) report that managers continue to delay disclosure of DCV until the date of the SEC filing.
To test these predictions I construct an earnings-announcement implied covenant violation measure using the reported earnings from the announcement, prior period financial statement information available at the earnings announcement date, and debt covenant-specific information from Dealscan. Because prior research has documented that debt-to-EBITDA is the most common financial covenant in private debt contracts, I conduct my analyses on this predominantly earnings-based covenant. Based on earnings reported in the preliminary earnings announcement, I estimate the updated debt-to-EBITDA ratio and compare it to the contracted covenant ratio value to calculate implied covenant slack. I validate the predictive ability of the measure on a large sample of disclosed covenant violations. The measure correctly predicts subsequently disclosed DCVs at least two quarters before they occur.

Next, I examine the three-day return around earnings announcements for firms with an earnings-based debt covenant. After controlling for the information content of earnings and a set of control variables employed in the prior literature, I find that announcement date returns are significantly negative for firms for which the updated covenant slack implies a covenant violation. Furthermore, for these implied covenant violation firms I find no evidence of a negative stock price response on the subsequent SEC filing when there is a disclosed covenant violation.

3 I use the term debt covenant violation throughout the paper to refer to one form of violation – technical default (or technical violation). This form of violation, based on accounting numbers, is distinct from other forms of violation (ex. payment default, borrowing or paying out dividends in excess of base limits).

4 Demerjian (2011, Table1) reports that debt-to-earnings covenants are the most commonly included financial covenants in private debt contracts, appearing in 53.2% of contracts. Additionally, he documents that their inclusion has increased over time – from 38.4% in 1996 to 65.1% in 2007.

5 Throughout the paper I use the term “earnings-based debt covenant” to denote debt covenants whose values are predominantly determined by earnings. This is consistent with Demerjian (2011) and Christiansen and Nikolaev (2012) who distinguish between “income-statement” and “balance-sheet” covenants even though many covenants contain components from both the income statement and balance sheet. My main covenant of interest, debt-to-EBITDA, would be an “income-statement” covenant under this classification – I use the term “earnings-based” covenant to highlight the important role that earnings play in my research design.
violation. These findings are consistent with the prior literature that documents a negative reaction to the disclosure of a DCV, but with the added insight that for firms with an earnings-based covenant, the market is able to update the likelihood of DCV on the earnings announcement date.

This study contributes to the literature in several ways. First, prior studies investigating the equity market reaction to DCVs employ samples of disclosed covenant violations. However, prior research has shown that the most common lender response to covenant violation is to waive the violation or renegotiate the terms of the loan. If a waiver or renegotiation occurs before the firm files its financial statements, it is not required to disclose that a violation took place. Thus, a violating firm that was able to renegotiate or obtain a waiver before filing with the SEC will not show up in samples of debt covenant violators. Prior research implicitly assumes that there is no cost of violating a debt covenant for these violations. This study extends our knowledge of the costs of violating a debt covenant by including firms that may have violated a debt covenant and then obtained a waiver or renegotiated the loan. The documented negative stock price reaction to implied covenant violations suggests that the total cost of covenant violations is higher than previously thought.

Second, prior studies investigating the equity market reactions to debt covenant violation utilize samples of debt covenant violations that are largely composed of balance-sheet rather than income-statement debt covenants. This accurately reflects the composition of debt contracts at the time of prior studies. However, Demerjian (2011) reports that while 82.8% of debt contracts contained a balance-sheet covenant in 1996 the inclusion drops to 31.5% by 2007. In contrast, this study focuses specifically an earnings-based debt covenant that is currently the most widely
utilized financial covenant in private debt contracts. This contribution is especially important because earnings-based debt covenants are now included in most debt contracts.

Third, this study provides evidence that market participants are able to update their beliefs about the likelihood of covenant violation earlier than has been previously demonstrated. Although prior studies have investigated the equity market reaction to disclosed covenant violations, usually made on the financial statement filing date, the results presented here provide evidence that market participants are able to update their expectations about the likelihood of an earnings-based covenant violation weeks before at the preliminary earnings announcement. While it is not surprising that market participants incorporate information as soon as it becomes available, no study has previously documented that market participants are able to reliably update their beliefs about earnings-based covenant violations at the earnings announcement date.

Lastly, the evidence presented here indicates that market participants view implied covenant violations to be costly, even if a violation is never explicitly disclosed. Given that the majority of violations of private debt contracts are technical defaults (as opposed to payment defaults) and that violation is not always associated with financial distress (Dichev and Skinner 2002), it is of interest to note the significant economic cost of violation, even in the absence of formal violation disclosure. In the next section I develop my hypotheses. I describe the sample selection procedures and variables used in this study in section III. Section IV presents the empirical results. A summary and conclusions are provided in section V.
II. Background and Hypothesis Development

Debt Covenants and the Costliness of Covenant Violations

Covenants are included in debt contracts to reduce lender risk by limiting managers’ ability to extract rents from debt holders and by giving lenders control of the firm during bad economic states of the firm. Debt holders suffer from borrower economic losses, and receive relatively little benefit from borrower economic gains, so they are concerned about gaining control of the firm as quickly as possible when their investment is at risk (see e.g., Aghion and Bolton 1992). Covenant inclusion restricts subsequent actions by the borrower, but the commitment to turn over firm control to the lender during bad states generates \textit{ex ante} more favorable borrowing terms for the borrowing firm (see e.g., Bradley and Roberts 2004).

Debt covenant violation is costly to shareholders (see Smith 1993). Gilson (1990) documents that creditors become large shareholders during bankruptcy; and Baird and Rasmussen (2006) argue that even before bankruptcy, lenders exert strong influence over firms after covenant violation. Recent research also provides evidence that covenant violations are associated with a shift of firm control to lenders (see, e.g., Roberts and Sufi 2009b for a survey of his literature). For example, Nini et al. (2012) find that DCVs are followed by increases in CEO turnover, increases in corporate restructurings, slowdowns in mergers and acquisitions, decreases in capital expenditures, and reductions in debt use and dividend payouts. Chava and Roberts (2008) also report that capital investment decreases after financial covenant violation. Roberts and Sufi (2009a) show that covenant violations lead to restricted access to debt financing, and Sufi (2009) shows that debt covenant violations lead to decreases in the

\footnote{Jensen and Meckling (1976) list unwarranted distributions to shareholders, issuance of higher priority debt claims, and investments in negative net present value projects for purposes of empire building and diversification as potential actions that the inclusion of debt covenants attempts to prevent.}
availability of lines of credit. These studies provide evidence that firms that violate debt covenants incur costs related to the transfer of control to lenders even before formal payment default.

Once a debt covenant is triggered, lenders can choose to accelerate the loan, renegotiate the contract, or grant a waiver. Renegotiation can be costly - Beneish and Press (1993) estimate that the average costs of DCV attributable to increased interest rates and renegotiation fees are between one and two percent of the market value of equity for their sample of firms.\(^7\) Roberts and Sufi (2009a) find that covenant violations are associated with increased interest rates. DCV may also result in the costly imposition of additional covenants during the negotiation process (Core and Schrand 1999).\(^8\)

Beneish and Press (1995a) investigate the stock price reaction to a DCV disclosure. Motivated by prior studies demonstrating the costliness of violation, Beneish and Press predict that the announcement of a violation will generate a negative stock price reaction. They employ a sample of 87 firms for which an accounting-based DCV was publicly disclosed in the financial statements on the SEC filing date or in a news media article. Beneish and Press find that announcements of technical default of debt covenants are associated with a significant negative 3.52% return in the three-day period surrounding disclosure of a debt covenant violation. In

\(^7\)Beneish and Press (1993) also find that waivers are costly for the firms that receive them. However, the costs of violation are lower for firms that can obtain a waiver than for those that cannot.

\(^8\)The severity of the cost of DCV has also been inferred from evidence of the exercise of managerial reporting discretion. Watts and Zimmerman (1978) posit that managers will choose accounting methods that will decrease the probability of debt covenant violation, and several studies have found evidence consistent with this assertion. Sweeney (1994) finds that firms that are approaching a debt covenant violation respond with income-increasing accounting changes. DeFond and Jiambalvo (1994) examine a sample of firms that violated debt covenants and find that in the year before and in the year of the covenant violation, total accruals and working capital accruals are significantly positive. Beatty and Weber (2003) find that firms with debt covenants are more likely to adopt income increasing accounting policies than are firms without debt covenants. Beneish et al. (2011) find evidence of earnings management and insider trading prior to default.
documenting the association between insider trading and DCV, Griffin et al. (2012) provide evidence of a similar negative reaction to the announcement of a DCV.

**Debt Covenant Violation Prediction**

The goal of this study is to explore the ability of the market to estimate the likelihood of a DCV may never be directly observed by the market. This study focuses on firms with earnings-based debt covenants because the earnings announcement date provides investors the ability to impound new information about the probability of a earnings-based covenant violation before the actual disclosure of a violation.\(^9\) The use of an event study methodology increases that likelihood that earnings announcements are the source of the information used to update the DCV probability. Whether a preliminary earnings announcement provides the market with sufficient information to infer a change in the probability of a DCV is an empirical question.

In order to test the market reaction to an implied DCV, it is necessary to construct a measure that reliably indicates the likelihood of covenant violation using only contemporaneously-available data. A recent study by Murfin (2012) creates a measure of contract “strictness” that attempts to capture the *ex ante* probability of covenant violation. Murfin incorporates four variables in the overall measure of contract “strictness”: the number of covenants (Nikolaev 2010), the tightness of each covenant, the scale of each covenant, and the covariance of covenant ratios. However, Murfin’s approach is unsuitable for the purposes of this study because most of the information that goes into his measures is stale or unavailable at the

---

\(^9\) Griffin et al. (2012) provide evidence that some informed market participants, firm insiders, begin to sell their personal holdings at least one month prior to covenant violation disclosure. However, given that they also document a negative price reaction to a DCV for their sample, it would appear that the report of changes in insider holdings is not sufficient to inform investors about the likelihood of a DCV in a complete and unbiased fashion.
earnings announcement date. 10 Dyreng (2010) also develops a model of covenant violation, drawing from the bankruptcy prediction literature beginning with Beaver (1966) and Altman (1968); but these models assume that covenant slack is a linear combination of accounting and market variables whereas the focus of my tests is on market reactions to new information. I include the non-market related variables used in Dyreng (2010) as controls in my tests.

Because I am interested in examining the ability of the market to infer earnings-based DCV, I require each contract in my sample to include an earnings-based covenant. Given the prevalence of various covenants in debt contracts and the availability of different covenant components at the earnings announcement date (see sample selection section for details), I focus on the debt-to-EBITDA covenant. I construct my measure by taking the contracted covenant ratio from Dealscan, information contemporaneously available, and the earnings reported at the earnings announcement date to derive an implied measure of covenant slack. I discuss the construction of the measure in more detail in the next section.

The approach I follow contains noise from at least two sources. First, the specific language used to define a debt covenant varies by contract. Identically named covenants need not be identically calculated. Second, even knowing the calculation used for a specific covenant in a specific contract may not guarantee exact measurement. Variation can occur from inclusion of non-GAAP accounting data that is certified by the CFO but is not publicly available (see, e.g., Leftwich 1983; Murfin 2012; Chava and Roberts 2009). In order to reduce the effect of noise in

10 Two of the components of the measure used by Murfin -- the number of covenants and the covenant scale -- do not change between earnings announcement dates. The remaining components -- covenant slack and covenant ratio covariance -- are updated quarterly using Compustat data. Thus, most of the information necessary to compute these components is not available on the earnings announcement date.
my measure, in my empirical tests I focus on the firms associated with the most negative and low slack estimates, by year, as the firms most likely to have violated an earnings-based covenant.

**Hypothesis Development**

Beneish and Press (1995a) predict and find a negative stock price reaction to the public disclosure of a DCV. For my sample of firms with an earnings-based debt covenant, it is not necessary to wait for a formal announcement from the firm or a news media article to infer a DCV.\(^\text{11}\) Consistent with Beneish and Press, if there is new information in reported earnings that increases the likelihood of a DCV then there will be a negative price reaction on the earnings announcement date.\(^\text{12}\)

Dichev and Skinner (2002) document that covenant violation occurs frequently - 30% of the loans in their sample experience a covenant violation during the loan maturity - and that the most common lender response to a DCV in their sample is to waive the violation.\(^\text{13}\) If implied violations are likely to be waived, and if waived violations are not costly, then it is possible that investors will not react to implied DCVs. Furthermore, Nini et al. (2012) provide evidence that while covenant violations are preceded by negative abnormal returns, they are followed by positive abnormal returns in the 24 months following a DCV. They argue that an increase in

---

\(^\text{11}\) Beneish and Press conduct their tests using a sample of largely balance-sheet covenants, consistent with the debt contract composition during their sample period as documented by Demerjian (2011). Approximately 90\% of the DCV announcements examined by Beneish and Press (1993, 1995a) involved violations of one or more of the following balance-sheet covenants: tangible net worth, current ratio, or leverage. Evidence presented later (in Table 2) suggests it would have been difficult to infer violations on earnings announcement dates for these covenants.

\(^\text{12}\) This reaction will be contingent on the ability of market participants to correctly identify implied violations at the earnings announcement date. As discussed in the next section, this ability is not obvious. Thus, the hypotheses are all joint tests of the empirical prediction and also the ability of the empirical measure to capture the construct of interest.

\(^\text{13}\) Dichev and Skinner (2002) also find that renegotiation is very common. Roberts and Sufi (2009c) use a large sample of private debt contracts and find that 90\% of long-term debt contracts are renegotiated at least once before maturity.
control by lenders improves firm prospects by eliminating entrenched, ineffective management and by streamlining firm operations. If DCVs trigger changes in firm management and strategy that investors expect will lead to subsequent improved performance, then it is possible that the market will react positively to an implied violation. Stated in the null form, my first formal hypothesis is as follows:

**H1:** *There is no stock price reaction to implied debt covenant violations at the earnings announcement date.*

Prior studies have focused on *first-time* covenant violations (Beneish and Press 1995a; Nini et al. 2012).14 First-time disclosure of covenant violations that are completely unanticipated should produce market reactions that capture the market’s unbiased assessment of the full cost of a particular violation. However, a first-time covenant violation may ultimately prove to be one of several early negative signals as firm performance continues to deteriorate. Nini et al. (2012) find that there is significant autocorrelation between covenant violations and that covenant violations lead to increases in CEO turnover and corporate restructuring and decreases in capital expenditures and debt usage. Thus, a covenant violation can be an early sign of a firm’s future decline, or it can be an opportunity to restructure and ensure positive performance in future periods. The uncertainty pertaining to the future implications of the covenant violation for the violating firm may not be resolved immediately and the market will update its beliefs over time.

When a covenant violation is followed by a period with no violation (a violation reversal) the

---

14 Beneish and Press (1995a) restrict their sample to firms that disclose a violation only once during their five-year sample period.
uncertainty about the path of a post-violation firm decreases. As a result, I predict that these violation reversals will lead to a positive market reaction. Formally, I predict:

\[ H2: \quad \text{There is a positive stock market reaction when a previous period implied debt covenant violation reverses.} \]

Beneish and Press (1995a) report that the SEC filing date of the 10-K or NT 10-K represents the disclosure date for over 60% of violations in their sample; the remaining public disclosures of a violation are gleaned from news media reports. Griffin et al. (2012) also find that most firms delay disclosure of covenant violations, typically delaying reporting them until being statutorily required to do so in the 10-K or 10-Q. For my sample, I verify that managers delay public disclosure of a covenant violation until the financial statements are filed with the SEC. If implied violations on earnings announcement dates preempt the information in violations disclosed on an SEC filing date, then I predict the market reaction to the disclosure of a DCV will be attenuated relative to firms that did not have an implied DCV before the filing date. This leads to my final hypothesis.

\[ H3: \quad \text{The negative stock price reaction to the disclosure of a debt covenant violation is attenuated for firms for which it was possible to infer debt covenant violation on a previous earnings announcement date.} \]

15 As noted earlier, Nini et al. (2012) document positive abnormal returns in the months after the disclosure of a DCV. Lender intervention that may have led to increases in firm efficiency, a reduction in negative NPV projects, and decreases in value-reducing manager behavior could have been the cause of improved performance associated with the reversal.

16 I investigate a random sample of 100 firm quarters for which a violation is disclosed in the financial statements. A news media article disclosing violation precedes the financial statement filing in 3% of this hand-collected sample. The low incidence of filing date preemption mitigates concerns that focusing on the SEC filing date is too restrictive.
III. Sample and Variable Definition

Data and Sample Selection

The private debt contracts represented in the Dealscan database represent a large source of corporate funds for these publicly-traded companies. Sufi (2007) reports that 90% of the 500 largest nonfinancial firms in COMPUSTAT obtained a loan through private channels between 1994 and 2002 and that the market for these loans grew to over $1 trillion by the end of his sample period. The value of private deals grew to over $1.7 trillion by 2007 (see Kim et al. 2011). Dealscan provides a unique package identification number for each debt issue as well as a company identification number and the stock ticker. I match Dealscan data to Compustat and CRSP using the linking table provided by Michael Roberts and detailed in Chava and Roberts (2008) to create a dataset that includes all the loan information from Dealscan and all the financial statement information from COMPUSTAT and returns data from CRSP. I require each debt issue observation to have all the required COMPUSTAT and CRSP data, and I conduct all tests at the firm-deal level following the prior literature.\footnote{The deal-level analysis decision is consistent with prior research and motivated in two ways. First, syndicated loan contracts are drafted at the deal level. All covenants and lenders are listed together on this contract regardless of the number of facilities (loans or lines of credit), so this is the relevant unit of observation. Second, analysis conducted at the facility level would bias standard errors downward because the same firm would be associated with multiple observations (see Sufi 2007; Murfin 2012; Anantharaman et al. 2011).}

I require sample observations to have all necessary Dealscan, COMPUSTAT, and CRSP data. In addition, because my empirical design relies on the ability of the market to infer DCV from reported earnings before firm disclosure of violation in the financial statements, I require the SEC filing date to occur after the earnings announcement date for all observations. Additionally, I truncate earnings at the 1\textsuperscript{st} and 99\textsuperscript{th} percentiles to reduce the impact of outliers. The final sample consists of 3,858 debt issues in Dealscan from 1997 to 2012. These 3,858 debt
issues involve 1,748 unique firms. Descriptive statistics summarizing the effect of sample selection criteria on the sample size are reported in Table 1.

*Covenant Choice*

My empirical strategy is to investigate whether market participants are able to identify and therefore react to earnings announcements that imply a debt covenant violation. I focus my analysis on one particular earnings-based debt covenant, debt-to-EBITDA, for two reasons. First, this covenant is the most common debt covenant in Dealscan, a dataset of private debt agreements created by the Thomson Reuters Loan Pricing Corporation (Demerjian 2011). As reported in Table 1, a debt-to-EBITDA covenant is included in 49.7% of all loan agreements from 1997 to 2012 for publicly traded loans without missing Dealscan data. In addition, and as mentioned previously, recent research has found a sharp decline in the use of balance-sheet covenants, but not of income-statement covenants, since at least 1996 (Demerjian 2011). This trend increases the importance of understanding earnings-based debt covenants in debt agreements. A second reason for focusing on debt-to-EBITDA is the high frequency with which information provided in earnings announcements can be used to update the estimated slack of a relevant covenant benchmark. This makes the debt-to-EBITDA covenant the ideal covenant to test the ability of market participants to update their beliefs about the likelihood of a DCV at the earnings announcement date using a large sample of loans.

Prior research has shown an increase over time in non-earnings disclosures concurrent with earnings announcements (Francis et al. 2002). To assess the availability of data to calculate debt-to-EBITDA relative to other covenants, I hand-collected 50 random earnings announcements from my sample and identified the frequency with which components of widely-used debt covenants were disclosed. Panel A of Table 2 indicates that 30% of the earnings
announcements in the random sample provided no covenant component information other than earnings. EBITDA was explicitly disclosed in 12% of announcements. Tax expense appeared in almost two-thirds of the earnings announcements and interest expense appeared in half the announcements. The most commonly reported non-earnings covenant information was current assets and liabilities, which appeared in 38% of the sampled earnings announcements (always together). Updated debt and equity amounts appeared in less than a third of announcements - not always together. Covenant components pertaining to capital expenditures, tangible assets, inventory, and cash holdings appeared in almost no earnings announcements.\(^\text{18}\)

I compared the covenant components reported in the preliminary earnings announcement to the numbers reported in the firms’ subsequently-filed financial statements to establish the reliability of earnings announcement date disclosures. Panel B of Table 2 reports how frequently reported components were equal to the actual components that appeared in the financial statements. I observed differences for 21% of the sample. For the firms that reported the same components in the earnings announcement as in the financial statements, there was an aggregation or scale change in 53% of the observations. For example, interest income and expense was commonly netted in the earnings announcement. Overall, the evidence in Table 2 suggests that the disclosure of earnings and other covenant components on earnings announcement dates allows for reasonable updating of covenants based largely on earnings, but that such updating is not possible for balance-sheet covenants.

\(^{18}\) Note that no firm in this random sample that would eventually disclose a covenant violation in their financial statements disclosed the violation in the preceding earnings announcement.
Implied Violation Variable Definition

In order to test the hypothesis of whether market participants are able to use earnings information disclosed on the earnings announcement date in order to update their beliefs about the likelihood of a DCV, it is necessary to construct a measure of implied DCV. I construct this measure using reported earnings from the announcement, other information available at the earnings announcement date, and debt covenant specific information from Dealscan. The two components needed to construct a measure of implied violation are debt-to-EBITDA and the outstanding covenant ratio listed in Dealscan at the date of the announcement. The debt-to-EBITDA ratio contains several components that may not be available to the market at the earnings announcement date. As indicated above, although some firms disclose debt, interest, taxes, depreciation, amortization, or EBITDA at the earnings announcement, the majority do not. To minimize look-ahead bias in my measure of implied DCV, I assume that only earnings are reported at the earnings announcement date and use prior period values for all other components of debt-to-EBITDA. Thus, as of the earnings announcement date, I combine newly-reported earnings with prior-period interest, taxes, depreciation, amortization, and debt to generate an updated value for the debt-to-EBITDA ratio.

The second component needed to calculate my measure of implied violation is the contract-specific debt-to-EBITDA covenant value from the debt agreement. This contracted covenant value remains constant for each firm during the loan life until a contract covenant value is renegotiated or until a new loan is issued, after which I use the updated covenant threshold.19

19 Demiroglu and James (2010) report that the terms of a loan in Dealscan are available in real time from the Loan Connector website. Consistent with Demiroglu and James, I assume that loan information is available to market participants on the deal active date reported in Dealscan.
Taken together, the two components create a firm-specific measure of implied violation that is updated quarterly and is calculated as follows:

\[ IDCV_{i,t} = Cov\_Ratio_{i,t} - \frac{(LTD_{i,t-1} + CurrLTD_{i,t-1})}{(NI_{i,t} + Interest_{i,t-1} + Tax_{i,t-1} + DepAmor_{i,t-1})} \] (1)

where, \( IDCV_{i,t} \) is the measure of implied debt covenant violation for firm \( i \) in quarter \( t \) constructed on the quarter \( t \) earnings announcement date; \( Cov\_Ratio_{i,t} \) is the maximum allowable value of debt-to-EBITDA for firm \( i \) in quarter \( t \), \( LTD_{i,t-1} \) is long-term debt, \( CurrLTD_{i,t-1} \) is the current portion of long-term debt, \( Interest_{i,t-1} \) is interest expense, \( Tax_{i,t-1} \) is tax expense and \( DepAmor_{i,t-1} \) is depreciation and amortization for firm \( i \) at the end of the previous quarter. \( NI_{t} \) is the earnings newly announced at the earnings announcement date.

\( IDCV \) identifies covenant violation with noise for at least two reasons. First, the use of quarter-old accounting data may limit the ability of market participants to effectively update their beliefs about likelihood of DCV. Second, the measure may be prohibitively coarse because of the extent to which many debt contracts use transformed values of GAAP, not actual GAAP numbers (see, e.g., Leftwich 1983; Chava and Roberts 2009; Murfin 2012). These measurement error concerns will bias against the ability of \( IDCV \) to accurately identify covenant violations.\(^{20}\)

To mitigate the effects of the noise in the measure, I rank \( IDCV \) and create an indicator variable that is equal to 1 if \( IDCV \) is in the most extreme quintile in a given year.\(^{21}\) This new variable,

\(^{20}\) Recently, Demerjian and Owens (2013) have provided evidence that using Compustat data to compute covenant slack does not introduce high measurement error. Looking at a large sample of detailed debt contracts, they find that Compustat-based measures of slack correctly identify violations in almost 90% of cases.

\(^{21}\) Selecting the extreme quintile is necessarily ad hoc, however, inferences do not change when the most extreme 15th and 25th percentiles are used. Nini et al. (2012) document that between 10% and 20% of firms disclose a covenant violation in their 10-K or 10-Q in any given year – this then reflects the lower bound of total covenant violations.
*Implied_Violation*, takes a value of 1 for the observations that most likely represent a covenant violation.

I validate my measure of *Implied_Violation* using a sample of known violators to provide assurance that the measure captures the construct of interest. The sample of known violators is the same used by Nini et al. (2012), and filing dates are obtained from the SEC website using Perl.\(^{22}\) The Nini et al. sample consists of firms with DCVs that are disclosed in the financial statements beginning after the initiation of electronic filing with the SEC and represents the universe of *disclosed* covenant violations during their sample period of 1996 to 2008.

**Descriptive Statistics**

Table 3 provides descriptive statistics for the sample data. Panel A reports that sample firms have an average of 2.73 financial covenants per debt issue. The maximum number of financial covenants in the sample is seven. The average loan size in the sample is $465M, and the average interest-spread (above LIBOR) is 212 basis points. The average contracted covenant value for debt-to-EBITDA is 3.90.

Panel B of Table 3 reports descriptive statistics for the variables used in the DCV prediction model as well as the abnormal returns specifications. Covenant violations (*Disclosed_Violation*) are disclosed in approximately 6.1% of the quarterly financial statements for the sample firms. The average quarterly earnings for the sample $22.2M, and sample firms experience losses in 20.07% of firm quarters. The average and median return on assets is -0.73% and 1.25%, respectively, per quarter. Consistent with larger firms being most able to access the private debt market, the firms contained in the sample are relatively large - average and median

---

\(^{22}\) I am grateful to Greg Nini, David Smith, and Amir Sufi for making these data publicly available. The data can be found on Amir Sufi’s website [http://faculty.chicagobooth.edu/amir.sufi/](http://faculty.chicagobooth.edu/amir.sufi/). Please refer to the appendix in Nini et al. (2012) for more information about how the sample was collected and how it can be interpreted.
assets are $2,372M and $938M, respectively. The average current ratio and interest coverage ratios are 1.95 and 10.17 respectively. By comparison, the sample firms used in Dyreng (2010) have an average current ratio of 2.02 and an average interest coverage ratio of 8.45.

I estimate abnormal returns as the three-day average market model residuals centered on the earnings announcement and financial statement filing dates (Collins et al. 2009). Firms experience an average earnings announcement date abnormal return of 0.42% and an average financial statement filing date abnormal return of 0.00%. Financial statements are filed approximately 12 days, on average, after the earnings announcement.

Table 3 Panel C provides a correlation matrix. Disclosed violations are negatively associated with earnings announcement abnormal returns, earnings surprise, return on assets, market-to-book, and the natural log of assets and are positively associated with losses. Implied earnings-based debt covenant violations are correlated in the same direction as disclosed violations, though the negative relation with assets is statistically insignificant. The positive univariate correlation between disclosed and implied violations is 17.4% and statistically significant, providing a preliminary indication that the measure of implied violation is a reasonable predictor of disclosed violation and that it captures the desired construct.

IV. Empirical Results

Implied Violation Measure Validation

Before testing my hypotheses, I validate the predictive ability of the Implied_Violation variable using the following logistic regression (firm subscripts are omitted in the remainder of the paper):
Disclosed_Violation_t+δ = \alpha_0 + \alpha_1 Implied_Violation_t+δ + \alpha_k CONTROLS_t + \gamma_{t+δ} \tag{2}

where, Disclosed_Violation is an indicator variable set to 1 if firm i disclosed a debt covenant violation in its financial statements for quarter t and 0 otherwise, and where δ takes on the values of 0 to 4.

If Implied_Violation correctly identifies firms that are more likely to publicly disclose a debt covenant violation, then values of Implied_Violation equal to 1 should indicate a higher likelihood of future DCV disclosure in the financial statements and the coefficient, \( \alpha_1 \), will be positive. Focusing on the likelihood of DCV, regardless of whether or not the firm formally discloses a technical violation, is important because a violating firm may obtain a waiver or renegotiate the terms of the loan without ever disclosing a violation in its financial statements. However, if waivers or renegotiations are costly, stock returns may impound this information when there is an implied DCV.

Several firm-specific characteristics are included as controls for other predictors of DCVs in EQ. (2). Many of these variables have significant explanatory power. Larger firms and firms with a higher market-to-book ratio are less likely to disclose a DCV, suggesting larger and more established firms are less susceptible to violation or have a greater ability to negotiate with lenders to obtain a waiver or a renegotiated contract. The probability of a disclosed DCV decreases with current and prior period ROA. I also include several of the variables proposed by Dyreng (2010) that control for other common debt covenants, such as current ratio and interest coverage covenants. I also include the interest rate (Spread) from the debt contract which incorporates the private information available to lenders but not the general public (Bharath et al. 2008). Nini et al. (2012) report that the 10-K is often a “catch-all” report in which firms disclose
information that is not included in the shorter quarterly reports. I include quarter fixed effects in addition to year fixed effects to control for differential quarterly reporting, and I cluster robust standard errors at the firm level.

Table 4 presents the results of estimating EQ. (2). The coefficient on *Implied_Violation* is positive and significant, which indicates that an implied violation at the earnings announcement date increases the probability of a firm disclosing a covenant violation in the subsequently filed financial statements. The measure of implied violation correctly identifies 559 of the 1,158 (48.3%) subsequently disclosed violations. Random assignment of firms into implied violation status would correctly identify 232 violators. Interestingly, while *Implied_Violation* is constructed from just one covenant, it is able to predict roughly half of all subsequently-disclosed violations. This finding provides evidence that market participants have the ability to use information available at the earnings announcement date to update their expectation of existing slack in earnings-based covenants. Furthermore, it provides further justification for the focus on debt-to-EBITDA.

The evidence in Table 4 also indicates that the *Implied_Violation* measure has the ability to predict disclosure of a DCV at least two quarters ahead. Specifications 2 through 5 present logistic regression results for *Disclosed_Violation*$_{t+1}$ through *Disclosed_Violation*$_{t+4}$. The coefficient on *Implied_Violation* is positive and significant in the $t+1$ and $t+2$ specifications, and positive but insignificant in the $t+3$ and $t+4$ specifications. The magnitude of the coefficients decreases over time, consistent with a decreasing timeliness in the predictive ability of *Implied_Violation*.\textsuperscript{23}

\textsuperscript{23} In addition, the coefficient on the indicator variable for losses is significant and negative across all specifications. Jiang (2008) investigates the effect of beating earnings benchmarks on a firm’s cost of debt. A main finding of Jiang’s study is that the consequences of beating earnings benchmarks (zero earnings, last year’s earnings, and
Market Reaction to Implied Debt Covenant Violations

The first hypothesis predicts that implied covenant violations will be associated with negative stock price reactions. To test this hypothesis I estimate the following OLS regression:

$$EA_{CAR_t} = \alpha_0 + \alpha_1 \text{Implied}_{\text{Violation}}_t + \alpha_k \text{CONTROLS}_t + \epsilon_t$$  \hspace{1cm} (3)

where, $EA_{CAR_t}$ is firm $i$’s three-day abnormal cumulative return centered on the earnings announcement date for quarter $t$, and $\text{Implied}_{\text{Violation}}$ is as previously defined.

I include a variety of variables in the regression to control for other determinants of abnormal returns. To control for financial information arriving to the market at the earnings announcement date, I include controls for losses, earnings, and earnings surprise. I also control for firm characteristics, including size and market-to-book (Skinner and Sloan 2002; Fama and French 1992) and include controls for the most common non-earnings-based debt covenants, current ratio and interest coverage. To control for the information content of earnings announcements, I include abnormal return variance and a measure of abnormal trading volume (Beaver 1968; Landsman and Maydew 2002; Collins et al. 2009). Finally, I investigate a random subset of 130 sample firms and confirm that there was no explicit disclosure of a DCV on the earnings announcement date.

Table 5 presents the results for tests of H1. As predicted, the coefficient on $\text{Implied}_{\text{Violation}}$ is significantly negative; the magnitude of the coefficient indicates that firms with an implied covenant violation experience a negative 0.54% announcement abnormal return.
incremental to the impact of the news in earnings surprise and other variables directly associated with the information content of earnings. Note that the incremental impact of losses and the market-to-book ratio on abnormal returns is also negative, while the incremental impact of ROA and earnings surprise is positive, consistent with prior research. The addition of the control variables significantly increases the explanatory power of the model without altering the inference that implied DCVs are associated with negative price responses.

The Table 5 results are consistent with the finding of a negative stock price reaction to the disclosure of a DCV on SEC filing dates in the prior literature. However, Table 5 suggests that the market impact of DCV has been underestimated in the previous literature, at least for earnings-based debt covenants. When the market is able to infer debt covenant violation at the earnings announcement date, the market reacts immediately, not waiting for a subsequent formal disclosure.\(^{24}\)

*Market Reaction to Covenant Violation Reversal*

Hypothesis 2 predicts that firms that report earnings that imply a reversal in the likelihood of an earnings-based debt covenant violation will experience a positive stock price reaction. I create an indicator variable, \(DCV_{Reversal}\), that is equal to 1 for firms that had an implied violation or disclosed a violation in the previous quarter but do not have an implied violation in the current period. I test H2 by estimating the following regression:

\[
EA_{CAR_t} = \alpha_0 + \alpha_1 DCV_{Reversal_t} + \alpha_k CONTROLS_t + \varepsilon_t
\]  

\(^{24}\) These results are robust to omitting firms that will subsequently disclose a covenant violation in their financial statements. This provides comfort that the documented negative reaction is not caused by the small subset of firms that will later disclose a DCV in their financial statements. It is possible that these DCVs are of a more serious nature.
Table 6 presents results for tests of H2. The coefficient on $DCV_{\text{Reversal}}$ is positive and significant, indicating a positive 1.05% abnormal return for firms for which the earnings announcement implies a relatively low likelihood of violation and the previous quarter was associated with either the high likelihood of a violation or a disclosed violation. This finding is consistent with the market viewing a first violation as an early sign of possible economic distress and with significant uncertainty (Beneish and Press 1995b). As reported in Chava and Roberts (2008) and Nini et al. (2012), covenant violations are followed by many economically significant events (ex. CEO turnover, shifts of control rights to lenders, reductions in capital expenditures and dividend payouts) whose consequences will only be observed over time. Implied measures of covenant slack that indicate a reduced likelihood of an additional violation are viewed positively.

**Market Reaction to Covenant Violation Disclosed in the Financial Statements**

Hypothesis 3 predicts that the negative stock price reaction to an actual announcement of a debt covenant violation is attenuated for firms for which it was possible to infer a debt covenant violation at the earnings announcement date. To test this hypothesis, I estimate the following OLS regression:

$$\text{SEC}_{\text{CAR}}_t = \alpha_0 + \alpha_1 \text{Disclosed_Violation}_t + \alpha_k \text{CONTROLS}_t + \varepsilon_t \quad (5)$$

where, $\text{SEC}_{\text{CAR}}_t$ is firm $i$’s three-day abnormal cumulative return centered on the 10-K or 10-Q filing date for quarter $t$, and $\text{Disclosed_Violation}$ is an indicator variable that is equal to 1 if a covenant violation was disclosed in the financial statements for the quarter. Recall that
Disclosed_Violation is the dependent variable in the logit models used to validate the implied violation measure.

Table 7 Column 1 presents the results of tests of H3 by estimating the market reaction to the disclosure of a DCV for firms with an implied covenant violation. I predict that the coefficient on Disclosed_Violation will be smaller for these firms than for firms without an implied covenant violation. Consistent with predictions, the coefficient on Disclosed_Violation is smaller than that documented in previous studies; in fact it is indistinguishable from zero with a p-value of .73. This table provides strong evidence of the absence of a negative reaction to DCV disclosure in the financial statements for firms with an implied debt covenant violation, suggesting earnings information preempts the impact of a DCV disclosure. This evidence does not contradict the findings of previous studies. As documented in the prior literature, these findings suggest that the market reacts negatively to news about debt covenant violation when it becomes publicly available. For the sample of earnings-based covenant firms employed in this study, the market is able to update the likelihood of a covenant violation at the earnings announcement date.

Alternative Explanations, Additional Tests, and Caveats

The motivation for this study is to assess whether the market has the ability to infer changes in the probability of DCV at the announcement of earnings for firms that have earnings-based debt covenants. One potential explanation for the absence of a negative reaction documented in Table 7 is a change in the information environment of borrowing firms since Beneish and Press (1995a) conducted their investigation. The time period examined in their study, 1983 to 1987, does not overlap with the period I study. Thus, it is possible that a general improvement in firms’ information environments subsequent to the period studied by Beneish
and Press may account for the result. It may also be the case that managers are more likely in the later time period to release DCV information before the formal announcement in the 10-K or 10-Q filing. Skinner (1994) finds that managers have incentives to preempt large negative earnings surprises by disclosing this information early. He finds that litigation and reputational costs increase when investors are surprised by bad news. These litigation and reputational costs may have increased compared to the period in the sample of Beneish and Press. Managers facing these costs may choose to disclose information about DCV before the filing of the financial statements.²⁵

I estimate EQ. (5) using the full sample of disclosed violations provided by Nini et al. (2012) that have the required Compustat and CRSP data to verify that the market reacts, on average, negatively to a disclosed DCV in the manner reported in Beneish and Press (1995a) and report the results in Table 7 Column 2. Consistent with the prior literature, the disclosure of a violation is associated with a significant negative abnormal return on the financial statement filing date. Disclosure of a covenant violation in the financial statements is associated with an abnormal return of negative 0.43% after controlling for financial performance, risk, and market factors. This test provides results consistent with the market reacting to the disclosure of covenant violations in the financial statements and mitigates concerns that the market reaction to DCV disclosure has changed over time.

My empirical findings are subject to a few caveats. First, while I attempt to provide evidence that the total cost of covenant violation is higher than documented in the previous literature, I am only able to provide evidence that one group of violators previously ignored

²⁵ Recall, however, that the hand-collected sample of firm disclosures around earnings announcements and financial statement filing dates provides little evidence of firm disclosure about covenant violation before the financial statement filing date.
experiences a cost of violation. Prior studies implicitly assumed that violators that never disclosed violation (because of a waiver or renegotiation) experienced no cost of DCV while I document a negative stock price reaction. This provides evidence that covenant violations previously ignored are costly; it does not speak to the total cost of a covenant violation which is incorporated fully in to the market over more than one period. Additionally, my findings are contingent on the ability of my measure to appropriately and consistently capture implied debt covenant violations. The use of my measure can lead to both Type 1 and Type 2 errors; that is, Implied_Violation could be incorrectly classifying non-violating firms as violating, and vice versa. However, there is no reason to believe that this potential misclassification will be systematically related to announcement date abnormal returns.

V. Summary and Conclusions

In this paper I construct a measure using information in firms’ earnings announcements that successfully predicts the incidence of earnings-based debt covenant violations, even for violations that will never be disclosed. I predict and find that the market is able to infer likely earnings-based debt covenant violations on the earnings announcement date using contemporaneously available information. These implied debt covenant violations are associated with significant negative stock price reactions on the earnings announcement date. These results complement the findings of prior studies that report negative stock price reactions to the formal announcement of DCVs. In contrast to evidence in prior studies, I find no evidence of a negative market reaction to the subsequent disclosure of a DCV on the SEC filing date in the case of firms for which an earnings-based DCV could be inferred at the preceding earnings announcement date.
Analysis of the implicit and explicit costs of DCV in prior studies typically begins with samples of firms that disclose a debt covenant violation. The market reaction to the disclosure is commonly used as a proxy for the cost of a violation. However, my results suggest that to the extent that the market can exploit publically available accounting information to infer a DCV that is subsequently disclosed (or occurred but was settled by waiver, renegotiation, or shifting of control rights), market reactions on the date of disclosure will understate the total costs of DCV in the cross-section. Further complication in assessing the cost of DCVs is suggested by evidence that investors react positively to accounting information that implies a reduction in the probability of an earnings-based debt covenant violation.

This study extends the literature that documents a negative stock price reaction to the announcement of debt covenant violations. I document that market participants are able to infer covenant violations for earnings-based debt covenants at the earnings announcement date, even if they will not be required to ever disclose a violation in their financial statements. This finding suggests an economic cost of covenant violation for a group of violators for which previous research has assumed no cost. Robustness tests confirm that my results are not likely to be an artifact of changes in the information environment of firms with private debt over time or differences in characteristics of sample firms or loan types covered by Dealscan and those of firms on which conclusions from the prior literature have been drawn. These results are significant given the increased importance of the private debt market and the prevalence of income-statement covenants in debt contracts.
### Table 1: Sample Selection

This panel presents the sample selection process.

<table>
<thead>
<tr>
<th>Filters</th>
<th>Number of Loans</th>
</tr>
</thead>
<tbody>
<tr>
<td>All loans to a US borrower, in US dollars, issued over the period 1997 to 2012</td>
<td>70,589</td>
</tr>
<tr>
<td>After eliminating loans to borrowers without a ticker</td>
<td>31,811</td>
</tr>
<tr>
<td>After elimination of loans with missing loan data</td>
<td>14,004</td>
</tr>
<tr>
<td>Loans with Debt-to-EBITDA covenant</td>
<td>6,965</td>
</tr>
<tr>
<td>After elimination of loans with insufficient firm data from COMPUSTAT and CRSP</td>
<td>3,858</td>
</tr>
</tbody>
</table>
Panel A: This panel presents descriptive statistics for debt covenant data reported in the earnings announcement.

<table>
<thead>
<tr>
<th>Disclosure Item</th>
<th>% of firms disclosing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Only Earnings (No other covenant components)†</td>
<td>30%</td>
</tr>
<tr>
<td>Disclosure of debt covenant violation*</td>
<td>0%</td>
</tr>
<tr>
<td>EBITDA</td>
<td>12%</td>
</tr>
<tr>
<td>Interest</td>
<td>50%</td>
</tr>
<tr>
<td>Tax Expense</td>
<td>62%</td>
</tr>
<tr>
<td>Depreciation &amp; Amortization</td>
<td>30%</td>
</tr>
<tr>
<td>Equity</td>
<td>34%</td>
</tr>
<tr>
<td>Long-Term Debt</td>
<td>30%</td>
</tr>
<tr>
<td>Current Portion of Long-term Debt</td>
<td>2%</td>
</tr>
<tr>
<td>Current Liabilities</td>
<td>38%</td>
</tr>
<tr>
<td>Current Assets</td>
<td>38%</td>
</tr>
<tr>
<td>Intangible Assets</td>
<td>0%</td>
</tr>
<tr>
<td>Capital Expenditure</td>
<td>2%</td>
</tr>
<tr>
<td>Cash &amp; Equivalents</td>
<td>6%</td>
</tr>
<tr>
<td>Inventory</td>
<td>0%</td>
</tr>
</tbody>
</table>
Panel B: This panel provides statistics comparing covenant data from the financial statements to data reported in the earnings announcement.

<table>
<thead>
<tr>
<th>Comparison Metric</th>
<th>% of firms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firms reporting the same information in the financial statements that was reported in the earnings announcement</td>
<td>79%</td>
</tr>
<tr>
<td>Firms reporting different information in the financial statements than was reported in the earnings announcement</td>
<td>21%</td>
</tr>
<tr>
<td>Conditional on reporting the same information in the financial statements as in the preliminary earnings announcement, the percentage of firms that aggregated covenant component information or significantly altered the reporting units of measurement (ex. combine interest income and interest expense in the earnings announcement)</td>
<td>53%</td>
</tr>
</tbody>
</table>

†I search for components of the following covenants: capital expenditure, debt-to-EBITDA, leverage, cash interest coverage, current ratio, and interest coverage.

‡The percent of firms that disclose no covenant component information other than earnings. These firms may disclose other financial information.

*The percent of firms that disclose a debt covenant violation at the earnings announcement that will eventually disclose violation in the financial statements.
Table 3: Descriptive Statistics

Panel A: Loan Characteristics

<table>
<thead>
<tr>
<th>Loan Characteristics:</th>
<th>Number of Observations</th>
<th>Mean</th>
<th>Std Dev</th>
<th>25th Pctl</th>
<th>Median</th>
<th>75th Pctl</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Financial Covenants</td>
<td>2.73</td>
<td>1.09</td>
<td>2.00</td>
<td>3.00</td>
<td>3.00</td>
<td></td>
</tr>
<tr>
<td>Loan Size (in millions)</td>
<td>464.93</td>
<td>108.03</td>
<td>75.00</td>
<td>200.00</td>
<td>450.00</td>
<td></td>
</tr>
<tr>
<td>Interest Spread (in bps)</td>
<td>211.98</td>
<td>58.78</td>
<td>200.00</td>
<td>200.00</td>
<td>200.00</td>
<td></td>
</tr>
<tr>
<td>Contractual debt-to-EBITDA value</td>
<td>3.90</td>
<td>1.70</td>
<td>3.00</td>
<td>3.50</td>
<td>4.50</td>
<td></td>
</tr>
<tr>
<td>Number of Lenders</td>
<td>55.15</td>
<td>7.68</td>
<td>51.00</td>
<td>51.00</td>
<td>60.00</td>
<td></td>
</tr>
</tbody>
</table>

Panel B: Sample Characteristics

<table>
<thead>
<tr>
<th>Disclosed_Violation*</th>
<th>Implied_Violation*</th>
<th>Loss*</th>
<th>ROA*</th>
<th>SUE*</th>
<th>Assets* (in millions)</th>
<th>MVE*</th>
<th>Ln_MTB*</th>
<th>Int_Coverage*</th>
<th>Curr_Ratio*</th>
<th>EA_CAR*</th>
<th>SEC_CAR*</th>
<th>EA_AVAR*</th>
<th>EA_AVOL*</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.13%</td>
<td>19.97%</td>
<td>22.20</td>
<td>-0.73%</td>
<td>0.00%</td>
<td>2,372.94</td>
<td>2,015.02</td>
<td>0.72</td>
<td>10.17</td>
<td>1.95</td>
<td>0.42%</td>
<td>0.00%</td>
<td>17.49</td>
<td>4.09</td>
</tr>
<tr>
<td>23.98%</td>
<td>39.83%</td>
<td>64.60</td>
<td>22.10%</td>
<td>0.19%</td>
<td>4,657.44</td>
<td>3,666.50</td>
<td>0.83</td>
<td>199.04</td>
<td>1.32</td>
<td>9.62%</td>
<td>8.49%</td>
<td>42.65</td>
<td>6.29</td>
</tr>
<tr>
<td>0.00%</td>
<td>0.00%</td>
<td>0.77</td>
<td>0.33%</td>
<td>-0.01%</td>
<td>371.72</td>
<td>256.24</td>
<td>0.23</td>
<td>0.13</td>
<td>1.19</td>
<td>-4.00%</td>
<td>-2.74%</td>
<td>2.26</td>
<td>0.11</td>
</tr>
<tr>
<td>0.00%</td>
<td>0.00%</td>
<td>8.02</td>
<td>1.25%</td>
<td>0.00%</td>
<td>938.15</td>
<td>787.28</td>
<td>0.68</td>
<td>1.01</td>
<td>1.69</td>
<td>0.10%</td>
<td>-0.17%</td>
<td>6.31</td>
<td>2.31</td>
</tr>
<tr>
<td>0.00%</td>
<td>0.00%</td>
<td>29.12</td>
<td>1.98%</td>
<td>0.01%</td>
<td>2,335.27</td>
<td>2,151.73</td>
<td>1.14</td>
<td>3.22</td>
<td>2.36</td>
<td>4.60%</td>
<td>2.47%</td>
<td>17.51</td>
<td>6.00</td>
</tr>
</tbody>
</table>

*N = 18,905 for this variable
### Panel C: Correlation Matrix

<table>
<thead>
<tr>
<th></th>
<th>Disclosed_Violation</th>
<th>Implied_Violation</th>
<th>EA_CAR</th>
<th>ROA</th>
<th>Loss</th>
<th>SUE</th>
<th>Ln_Assets</th>
<th>MTB</th>
<th>Spread</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Disclosed_Violation</strong></td>
<td>0.174</td>
<td>-0.012</td>
<td>-0.139</td>
<td>0.256</td>
<td>-0.026</td>
<td>-0.072</td>
<td>-0.152</td>
<td>0.089</td>
<td></td>
</tr>
<tr>
<td><strong>Implied_Violation</strong></td>
<td>&lt;0.001</td>
<td>-0.060</td>
<td>-0.203</td>
<td>0.538</td>
<td>-0.023</td>
<td>-0.009</td>
<td>-0.157</td>
<td>0.005</td>
<td></td>
</tr>
<tr>
<td><strong>EA_CAR</strong></td>
<td>0.106</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>0.419</td>
<td></td>
</tr>
<tr>
<td><strong>ROA</strong></td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td><strong>Loss</strong></td>
<td>0.002</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>0.019</td>
<td>-0.086</td>
<td>0.003</td>
<td>0.007</td>
<td></td>
</tr>
<tr>
<td><strong>SUE</strong></td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td><strong>Ln_Assets</strong></td>
<td>0.022</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>0.159</td>
<td>0.003</td>
<td>0.153</td>
<td>-0.031</td>
<td></td>
</tr>
<tr>
<td><strong>MTB</strong></td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td><strong>Spread</strong></td>
<td>0.088</td>
<td>0.510</td>
<td>0.852</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>0.822</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td></td>
</tr>
</tbody>
</table>
Table 4: Debt Covenant Violation Prediction Logit Regression Results

Probability Modeled: Disclosed_Violation= 1

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>Coefficient</th>
<th>Pr&gt;ChiSq</th>
<th>Coefficient</th>
<th>Pr&gt;ChiSq</th>
<th>Coefficient</th>
<th>Pr&gt;ChiSq</th>
<th>Coefficient</th>
<th>Pr&gt;ChiSq</th>
<th>Coefficient</th>
<th>Pr&gt;ChiSq</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-0.0395</td>
<td>0.9168</td>
<td>0.0351</td>
<td>0.9243</td>
<td>0.2056</td>
<td>0.5963</td>
<td>0.2474</td>
<td>0.5397</td>
<td>0.2247</td>
<td>0.5976</td>
</tr>
<tr>
<td>Implied_Violation (_t)</td>
<td>0.5434</td>
<td>&lt;.0001</td>
<td>0.3005</td>
<td>0.0063</td>
<td>0.4309</td>
<td>0.0001</td>
<td>0.2590</td>
<td>0.0351</td>
<td>0.0809</td>
<td>0.5391</td>
</tr>
<tr>
<td>ROA (_t)</td>
<td>-0.8392</td>
<td>0.4048</td>
<td>0.2135</td>
<td>0.8110</td>
<td>-1.1430</td>
<td>0.2845</td>
<td>0.2907</td>
<td>0.7987</td>
<td>-3.9078</td>
<td>0.0059</td>
</tr>
<tr>
<td>ROA (_t-1)</td>
<td>-4.5257</td>
<td>&lt;.0001</td>
<td>-4.6429</td>
<td>&lt;.0001</td>
<td>-3.3547</td>
<td>0.0003</td>
<td>-4.7020</td>
<td>&lt;.0001</td>
<td>-3.4597</td>
<td>0.0004</td>
</tr>
<tr>
<td>Loss (_t)</td>
<td>1.1841</td>
<td>&lt;.0001</td>
<td>1.0929</td>
<td>&lt;.0001</td>
<td>0.6505</td>
<td>&lt;.0001</td>
<td>0.5998</td>
<td>&lt;.0001</td>
<td>0.4284</td>
<td>0.0015</td>
</tr>
<tr>
<td>SUE (_t)</td>
<td>-0.0633</td>
<td>0.3485</td>
<td>0.0589</td>
<td>0.2643</td>
<td>0.0219</td>
<td>0.7577</td>
<td>-0.1329</td>
<td>0.0910</td>
<td>0.1357</td>
<td>0.3091</td>
</tr>
<tr>
<td>MTB (_t)</td>
<td>-0.4114</td>
<td>&lt;.0001</td>
<td>-0.4130</td>
<td>&lt;.0001</td>
<td>-0.3808</td>
<td>&lt;.0001</td>
<td>-0.3564</td>
<td>&lt;.0001</td>
<td>-0.3173</td>
<td>0.0001</td>
</tr>
<tr>
<td>Ln_Assets (_t)</td>
<td>-0.4517</td>
<td>&lt;.0001</td>
<td>-0.4594</td>
<td>&lt;.0001</td>
<td>-0.4888</td>
<td>&lt;.0001</td>
<td>-0.5073</td>
<td>&lt;.0001</td>
<td>-0.4874</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Spread (_t)</td>
<td>0.0013</td>
<td>0.1301</td>
<td>0.0012</td>
<td>0.1822</td>
<td>0.0010</td>
<td>0.2896</td>
<td>0.0009</td>
<td>0.2993</td>
<td>0.0011</td>
<td>0.2283</td>
</tr>
<tr>
<td>Cov_Ratio (_t)</td>
<td>-0.0321</td>
<td>0.2306</td>
<td>-0.0301</td>
<td>0.3100</td>
<td>-0.0145</td>
<td>0.6324</td>
<td>0.0057</td>
<td>0.8530</td>
<td>0.0076</td>
<td>0.8088</td>
</tr>
<tr>
<td>Int_Coverage (_t)</td>
<td>0.0000</td>
<td>0.7749</td>
<td>-0.0015</td>
<td>0.0994</td>
<td>-0.0017</td>
<td>0.1330</td>
<td>-0.0011</td>
<td>0.2408</td>
<td>-0.0005</td>
<td>0.4066</td>
</tr>
<tr>
<td>Curr_Ratio (_t)</td>
<td>-0.2568</td>
<td>&lt;.0001</td>
<td>-0.2037</td>
<td>&lt;.0001</td>
<td>-0.1423</td>
<td>0.0026</td>
<td>-0.1183</td>
<td>0.0098</td>
<td>-0.1131</td>
<td>0.0161</td>
</tr>
</tbody>
</table>

Fixed Effects
- Yr, Qtr
- Firm

Clustered SE
- N_VIOL=0
  - 17,747
  - 16,520
  - 15,311
  - 14,149
  - 13,024
- N_VIOL=1
  - 1,158
  - 1,058
  - 965
  - 863
  - 768
- R-squared
  - 0.0909
  - 0.0753
  - 0.0623
  - 0.0566
  - 0.0485
- Max-rescaled R-Squared
  - 0.2461
  - 0.2060
  - 0.1719
  - 0.1591
  - 0.1387
Table 4 presents results from a logistic regression of the following model using firm-quarters over the period 1997 to 2008:

\[
\text{Disclosed\_Violation}_{it+\delta} = \alpha_0 + \alpha_1\text{Implied\_Violation}_i + \alpha_2\text{ROA}_t + \alpha_3\text{ROA}_{t-1} + \alpha_4\text{Loss}_t + \alpha_5\text{SUE}_t + \\
\alpha_6\text{MTB}_t + \alpha_7\ln\text{Assets}_{t-1} + \alpha_8\text{Spread}_t + \alpha_9\text{Cov\_Ratio}_t + \alpha_{10}\text{Int\_Coverage}_{t-1} + \alpha_{11}\text{Curr\_Ratio}_{t-1} + \gamma_{it+\delta}
\]

(2)

\(\text{Disclosed\_Violation}_i\) is an indicator variable that = 1 if firm \(i\) disclosed a debt covenant violation in its financial statements for quarter \(t\) and = 0 otherwise and \(\delta\) takes the values of 0 to 4 for all dependent and independent variables. \(\text{Implied\_Violation}_i\) is an indicator variable that = 1 for the most extreme quintile (highest likelihood of covenant violation) by year of implied covenant slack, constructed on the earnings announcement date for quarter \(t\) and = 0 otherwise. \(\text{ROA}_t\) is net income for firm \(i\) in quarter \(t\) divided by assets in quarter \(t-1\) and \(\text{ROA}_{t-1}\) is the return on assets for quarter \(t-1\). \(\text{Loss}_t\) is in indicator variable = 1 if the firm experienced a loss in quarter \(t\). \(\text{SUE}_t\) is earnings for quarter \(t\) less earnings for quarter \(t-1\) scaled by the market value of equity in quarter \(t-1\) for firm \(i\). \(\text{MTB}_t\) is the market value of equity divided by the book value of equity for quarter \(t\). \(\ln\text{Assets}_{t-1}\) is the natural log of assets for quarter \(t-1\). \(\text{Spread}_t\) is the interest spread above LIBOR reported in the debt contract. \(\text{Cov\_Ratio}_t\) is the maximum allowable value of debt-to-EBITDA for firm \(i\) in quarter \(t\) before a technical violation. \(\text{Int\_Coverage}_{t-1}\) is the interest coverage ratio for firm \(i\) in quarter \(t-1\). \(\text{Curr\_Ratio}_{t-1}\) is current assets divided by current liabilities for quarter \(t-1\). The standard errors are clustered by firm. Year and quarter fixed effects are included.
Table 5: Market Response to Implied Debt Covenant Violation

**Dependent Variable: EA\_CAR\_t**

| VARIABLES           | Coefficient Estimate | Pr>|t| | Coefficient Estimate | Pr>|t| | Coefficient Estimate | Pr>|t| | Coefficient Estimate | Pr>|t| |
|---------------------|----------------------|-------|----------------------|-------|----------------------|-------|----------------------|-------|----------------------|-------|
| **Intercept**       | 0.0021               | 0.5224 | 0.0149               | 0.0016 | 0.0160               | 0.0079 | 0.0105               | 0.0787 |
| **Implied\_Violation\_t** | -0.0165               | <.0001 | -0.0045               | 0.0130 | -0.0044               | 0.0178 | -0.0054               | 0.0032 |
| **Loss\_t**         | -0.0221               | <.0001 | -0.0223               | <.0001 | -0.0224               | <.0001 |                     |       |
| **ROA\_t**          | 0.0070               | 0.1277 | 0.0071               | 0.1182 | 0.0070               | 0.1285 |                     |       |
| **SUE\_t**          | 0.0070               | 0.1553 | 0.0067               | 0.1637 | 0.0068               | 0.1590 |                     |       |
| **MTB\_t**          | -0.0039               | <.0001 | -0.0041               | <.0001 | -0.0037               | <.0001 |                     |       |
| **Ln\_Assets\_t-1** | -0.0009               | 0.0608 | -0.0010               | 0.0362 | -0.0005               | 0.3352 |                     |       |
| **Spread\_t**       |                      |       |                      |       |                      |       | 0.0000               | 0.4531 | 0.0000               | 0.3999 |
| **Cov\_Ratio\_t**   |                      |       |                      |       |                      |       | 0.0002               | 0.5909 | 0.0002               | 0.5667 |
| **Int\_Coverage\_t-1** |                      |       |                      |       |                      |       | 0.0000               | 0.0012 | 0.0000               | 0.0002 |
| **Curr\_Ratio\_t-1** |                      |       |                      |       |                      |       | -0.0014              | 0.0047 | -0.0012              | 0.0189 |
| **EA\_AVAR\_t**     |                      |       |                      |       |                      |       | -0.0018              | <.0001 |                     |       |
| **EA\_AVOL\_t**     |                      |       |                      |       |                      |       | 0.0004               | <.0001 |                     |       |

**Fixed Effects**
- Year
- Firm

**Clustered SE**
- Firm

**Number of Observations**
- 30,914

**R-squared**
- 0.0067
- 0.0137
- 0.0141
- 0.0338
Table 5 presents results from the OLS estimation of the following model using firm-quarter earnings announcements over the period 1997 to 2006:

$$
EA\_CAR_t = a_0 + \alpha_1\text{Implied\_Violation}_t + \alpha_2\text{Loss}_t + \alpha_3\text{ROA}_t + \alpha_4\text{SUE}_t + \alpha_5\text{MTB}_t + \alpha_6\text{Ln\_Assets}_{t-1} + \alpha_7\text{Spread}_t + \alpha_8\text{Cov\_Ratio}_{t-1} + \alpha_9\text{Int\_Coverage}_{t-1} + \alpha_{10}\text{Curr\_Ratio}_{t-1} + \alpha_{11}\text{EA\_AVAR}_t + \alpha_{12}\text{EA\_AVOL}_t + \gamma_t
$$

(3)

$EA\_CAR_t$ is firm $i$’s 3-day abnormal cumulative return centered on the earnings announcement date for quarter $t$. $\text{Implied\_Violation}_t$ is an indicator variable that = 1 for the most extreme quintile by year of implied covenant slack, constructed on the earnings announcement date for quarter $t$ and = 0 otherwise. $\text{Loss}_t$ is in indicator variable = 1 if the firm experienced a loss in quarter $t$. $\text{ROA}_t$ is net income for firm $i$ in quarter $t$ divided by assets in quarter $t-1$. $\text{SUE}_t$ is earnings for quarter $t$ less earnings for quarter $t-1$ scaled by the market value of equity in quarter $t-1$ for firm $i$ and is truncated at the 1st and 99th percentiles. $\text{MTB}_t$ is the market value of equity in quarter $t$ divided by the book value of equity for quarter $t-1$. $\text{Ln\_Assets}_{t-1}$ is the natural log of assets for quarter $t-1$. $\text{Spread}_t$ is the interest spread above LIBOR reported in the debt contract. $\text{Cov\_Ratio}_{t-1}$ is the maximum allowable value of debt-to-EBITDA for firm $i$ in quarter $t$ before a technical violation occurs. $\text{Int\_Coverage}_{t-1}$ is the interest coverage ratio for firm $i$ in quarter $t-1$. $\text{Curr\_Ratio}_{t-1}$ is current assets divided by current liabilities for quarter $t-1$. $\text{EA\_AVAR}_t$ is the 3-day abnormal variance centered on the earnings announcement date for firm $i$ in quarter $t$. $\text{EA\_AVOL}_t$ is the 3-day abnormal trading volume centered on the earnings announcement date for firm $i$ in quarter $t$. The standard errors are robust to heteroskedasticity and clustered by firm. Year fixed effects are included. $P$-values are reported for two-tailed tests.
Table 6: Market Response to Covenant Violation Reversal

Dependent Variable: EA_CAR_t

| VARIABLES                | Coefficient Estimate | Pr>|t|  | Coefficient Estimate | Pr>|t|  | Coefficient Estimate | Pr>|t|  | Coefficient Estimate | Pr>|t|  |
|--------------------------|----------------------|--------|----------------------|--------|----------------------|--------|----------------------|--------|----------------------|--------|
| Intercept                | -0.0007              | 0.8302 | 0.0151               | 0.0014 | 0.0161               | 0.0075 | 0.0110               | 0.0668 |
| DCV_Reversal_t           | 0.0111               | <.0001 | 0.0108               | <.0001 | 0.0106               | <.0001 | 0.0105               | <.0001 |
| Loss_t                   | -0.0245              | <.0001 | -0.0247              | <.0001 | -0.0249              | <.0001 |                      |        |
| ROA_t                    | 0.0070               | 0.1257 | 0.0073               | 0.1105 | 0.0071               | 0.1233 |                      |        |
| SUE_t                    | 0.0067               | 0.1695 | 0.0065               | 0.1735 | 0.0065               | 0.1763 |                      |        |
| MTB_t                    | -0.0036              | <.0001 | -0.0038              | <.0001 | -0.0033              | <.0001 |                      |        |
| Ln_Assets_t-1            | -0.0010              | 0.0316 | -0.0010              | 0.0328 | -0.0005              | 0.3017 |                      |        |
| Spread_t                 | 0.0000               | 0.4265 | 0.0000               | 0.4009 |                      |        |                      |        |
| Cov_Ratio_t              | -0.0001              | 0.8354 | -0.0001              | 0.7814 |                      |        |                      |        |
| Int_Coverage_t-1         | 0.0000               | 0.0007 | 0.0000               | 0.0001 |                      |        |                      |        |
| Curr_Ratio_t-1           | -0.0013              | 0.0096 | -0.0011              | 0.0365 |                      |        | -0.0018              | <.0001 |
| EA_AVAR_t                |                      |        |                      |        |                      |        |                      |        |
| EA_AVOL_t                |                      |        |                      |        |                      |        |                      |        |

Fixed Effects

<table>
<thead>
<tr>
<th></th>
<th>Year</th>
<th>Year</th>
<th>Year</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clustered SE</td>
<td>Firm</td>
<td>Firm</td>
<td>Firm</td>
<td>Firm</td>
</tr>
<tr>
<td>Number of Observations</td>
<td>30,914</td>
<td>30,914</td>
<td>30,914</td>
<td>30,914</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.0035</td>
<td>0.0145</td>
<td>0.0150</td>
<td>0.0345</td>
</tr>
</tbody>
</table>
Table 6 presents results from the OLS estimation of the following model using firm-quarter earnings announcements over the period 1997 to 2006:

\[
EA_{\text{CAR}} = \alpha_0 + \alpha_1 DCV_{\text{Reversal}} + \alpha_2 Loss + \alpha_3 ROA + \alpha_4 SUE_i + \alpha_5 MTB_i + \alpha_6 Ln_{\text{Assets}_{i,t-1}} + \alpha_7 Spread_i + \\
\alpha_8 Cov_{\text{Ratio}}_{i,t-1} + \alpha_9 Int_{\text{Coverage}}_{i,t-1} + \alpha_{10} EA_{\text{AVAR}}_{i,t-1} + \alpha_{11} EA_{\text{AVOL}}_{i,t-1} + \gamma_i
\] (4)

\(EA_{\text{CAR}}\) is firm \(i\)’s 3-day abnormal cumulative return centered on the earnings announcement date for quarter \(t\). \(DCV_{\text{Reversal}}\) is an indicator variable that = 1 for firms that had an implied violation or disclosed a violation in the previous quarter but that do not have an implied violation in the current period and that will not disclose a violation in the yet-to-be-filed financial statements and = 0 otherwise. \(Loss\), is in indicator variable = 1 if the firm experienced a loss in quarter \(t\). \(ROA\), is net income for firm \(i\) in quarter \(t\) divided by assets in quarter \(t-1\). \(SUE\), is earnings for quarter \(t\) less earnings for quarter \(t-1\) scaled by the market value of equity in quarter \(t-1\) for firm \(i\) and is truncated at the 1st and 99th percentiles. \(MTB\), is the natural log of the market value of equity divided by the book value of equity in quarter \(t-1\). \(Ln_{\text{Assets}}_{i,t-1}\) is the natural log of the book value of assets for quarter \(t-1\). \(Spread\), is the interest spread above LIBOR reported in the debt contract. \(Cov_{\text{Ratio}}\), is the maximum allowable value of debt-to-EBITDA for firm \(i\) in quarter \(t-1\). \(Int_{\text{Coverage}}_{i,t-1}\), is the interest coverage ratio for firm \(i\) in quarter \(t-1\). \(Curr_{\text{Ratio}}_{i,t-1}\) is current assets divided by current liabilities for quarter \(t-1\). \(EA_{\text{AVAR}}_{i,t-1}\) is the 3-day abnormal variance centered on the earnings announcement date for firm \(i\) in quarter \(t-1\). \(EA_{\text{AVOL}}_{i,t-1}\) is the 3-day abnormal trading volume centered on the earnings announcement date for firm \(i\) in quarter \(t\). The standard errors are robust to heteroskedasticity and clustered by firm. Year fixed effects are included. \(P\)-values are reported for two-tailed tests.
Table 7: Market Response to Disclosed Violations

Dependent Variable: SEC_CAR$_t$

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>(1) Firms With An Implied Violation</th>
<th>(2) Full Nini et al. (2012) Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Estimate</td>
<td>p-value</td>
</tr>
<tr>
<td>Intercept</td>
<td>0.0066</td>
<td>0.5190</td>
</tr>
<tr>
<td>Disclosed_Violation$_t$</td>
<td>-0.0019</td>
<td>0.7300</td>
</tr>
<tr>
<td>Loss$_t$</td>
<td>-0.0047</td>
<td>0.0990</td>
</tr>
<tr>
<td>ROA$_t$</td>
<td>0.0217</td>
<td>0.0047</td>
</tr>
<tr>
<td>SUE$_t$</td>
<td>0.0032</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>MTB$_t$</td>
<td>0.0003</td>
<td>0.8541</td>
</tr>
<tr>
<td>Ln_Assets$_t$</td>
<td>0.0007</td>
<td>0.5542</td>
</tr>
<tr>
<td>Curr_Ratio$_t$</td>
<td>-0.0001</td>
<td>0.3388</td>
</tr>
<tr>
<td>Int_Coverage$_t$</td>
<td>-0.0009</td>
<td>0.3885</td>
</tr>
<tr>
<td>SEC_AVAR$_t$</td>
<td>-0.0001</td>
<td>0.7299</td>
</tr>
<tr>
<td>SEC_AVOL$_t$</td>
<td>0.0000</td>
<td>0.8651</td>
</tr>
</tbody>
</table>

Fixed Effects: Yes
Clustered SE: Firm
Number of Observations:
Firms With An Implied Violation: 3,714
Full Nini et al. (2012) Sample: 168,486
R-squared:
Firms With An Implied Violation: 0.0161
Full Nini et al. (2012) Sample: 0.1078
Table 7 presents results from the OLS estimation of the following model using firm-quarter earnings announcements over the period 1997 to 2008:

\[
\text{SEC}_\text{CAR}_i = \alpha_0 + \alpha_1 \text{Disclosed}_\text{Violation}_i + \alpha_2 \text{Loss}_i + \alpha_3 \text{ROA}_i + \alpha_4 \text{SUE}_i + \alpha_5 \text{MTB}_i + \alpha_6 \text{Ln}_\text{Assets}_i \\
+ \alpha_7 \text{Curr}_\text{Ratio}_i + \alpha_8 \text{Int}_\text{Coverage}_i + \alpha_9 \text{SEC}_\text{AVAR}_i + \alpha_{10} \text{SEC}_\text{AVOL}_i + \gamma_i
\]

\( (5) \)

\( \text{SEC}_\text{CAR}_i \) is firm \( i \)'s 3-day abnormal cumulative return centered on the financial statement filing date for quarter \( t \). \( \text{Disclosed}_\text{Violation}_i \) is an indicator variable that = 1 if a firm \( i \) disclosed a debt covenant violation in its financial statements for quarter \( t \) and = 0 otherwise. \( \text{ROA}_i \) is net income for firm \( i \) in quarter \( t \) divided by assets in quarter \( t-1 \). \( \text{Loss}_i \) is indicator variable = 1 if the firm experienced a loss in quarter \( t \). \( \text{SUE}_i \) is earnings for quarter \( t \) less earnings for quarter \( t-1 \) scaled by the market value of equity in quarter \( t-1 \) for firm \( i \). \( \text{Ln}_\text{Assets}_i \) is the natural log of the book value of assets for quarter \( t \). \( \text{MTB}_i \) is the natural log of the market value of equity divided by the book value of equity in quarter \( t \). \( \text{Curr}_\text{Ratio}_i \) is current assets divided by current liabilities for quarter \( t \). \( \text{Int}_\text{Coverage}_i \) is the interest coverage ratio for quarter \( t \). \( \text{SEC}_\text{AVAR}_i \) is the 3-day abnormal variance centered on the financial statement filing date for firm \( i \) in quarter \( t \). \( \text{SEC}_\text{AVOL}_i \) is the 3-day abnormal trading volume centered on the financial statement filing date for firm \( i \) in quarter \( t \). The standard errors are robust to heteroskedasticity and clustered by firm. Year fixed effects are included, and p-values are reported for two-tailed tests.
REFERENCES


