The Role of Audit Verification in Debt Contracting: Evidence from Covenant Violations

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Abstract We investigate the role of audit verification in the resolution process following debt covenant violations. Using two sets of proxies for demand—audit fees and the independence and diligence of audit committees—we find evidence that covenant violations result in a demand for differentially higher levels of audit verification. Further analyses demonstrate the link between the increased demand for audit verification and the mechanisms designed to control agency costs in debt contracts. We document cross-sectional variations in the observed fee differential with respect to the level of reliance on financial covenants, the type of covenants violated, and waiver decisions. Moreover, we find that the observed audit fee increases are associated with more favorable movements in borrowing costs and the adoption of more conservative investment policies post violation. Our findings suggest that covenant violations increase the demand for audit services to help control contracting costs post violation.

Keywords: corporate governance; auditor monitoring; covenant violation; audit committee

1. Introduction

Financial reporting and audit verification of financial statements play an important role in contracting and monitoring (Armstrong et al. 2010; Bushman and Smith 2001; Lambert 2001; Shivakumar 2013; Watts and Zimmerman 1983, 1986). In the context of debt financing, accounting-based covenants help mitigate agency costs and enable more efficient contracting. From the contracting perspective, violations of debt covenants represent the states in which the increased conflicts of interest warrant the transfer of control rights to creditors. In this study, we examine whether violations of debt covenants increase the demand for audit services to help control contracting costs post violation.

Previous research has established that covenant violations occur frequently, affect many firms, are usually observed well outside of financial distress, and rarely lead to acceleration of the loan (Dichev and Skinner 2002; Gopalakrishnan and Parkash 1995; Nini et al. 2012). Moreover, recent empirical evidence suggests that creditors begin to play a more active corporate governance role post violation, which helps reduce managerial opportunism and improve firm value (Chava and Roberts 2008; Chava et al. 2010; Nini et al. 2009, 2012). Collectively, these findings suggest that technical violations serve as an early warning of heightened managerial agency risk and are often followed by changes in firm governance to address the increased agency problems.

These findings highlight the importance of the resolution of covenant violations in debt contracting and raise questions about the role of audit verification in this process. Theory suggests that the demand for audit services increases with the increase in agency conflicts faced by the firm (Defond and Zhang, 2014). This is consistent with the idea widely held by professionals and regulators that external auditors contribute to corporate governance by

helping reduce moral hazard problems.[1] A primary role of the audit is to facilitate better monitoring of managers by exposing potential managerial opportunism (Watts and Zimmerman 1983). Given the governance function of the audit, we argue that expectations of higher agency costs post violation will increase the demand for audit services to limit the heightened agency problems.

We empirically test this prediction using a sample of U.S. public firms with outstanding loans. We capture the demand for audit verification through two dimensions: audit fees and audit committees. There is an extensive literature that examines how the demand-side factors shape audits using fees as a proxy for the level of verification chosen by the client (e.g., Ball et al. 2012; DeFond and Zhang 2014).[2] Following this literature, we examine the incremental impact of covenant violations on audit fees after controlling for other known determinants of audit fees. We document that firms that have recently violated a covenant pay more for audit services than non-violating peers during the violation year and until three years after the initial violation, holding everything else constant. The documented increases are both statistically and economically significant, ranging from 5% to 11%.[3]

Our second set of proxies for the demand of audit services is based on audit committee characteristics. The auditing literature demonstrates that increased demand for audit services leads to the development of competencies that help achieve the desired level of audit verification (DeFond and Zhang 2014). Audit committee characteristics represent one of the

[1] For example, the corporate governance role of external auditors is discussed in the United States Securities Exchange Commission's pronouncement on Audit Committee Disclosure (1999), Corporate Governance Survey of Institutional Investors by PricewaterhouseCoopers of Singapore (1999), and the Asian Corporate Governance Association research report (2000).

[2] As Ball et al. (2012) explain, the choice of the client influences the level of audit services through various dimensions including "the choice of audit firm (e.g., Big Four versus smaller firm), the seniority level of the audit engagement partner, the number of audit personnel on the job and their average hourly rate, the degree of verification of internal control systems and individual transactions required by the client, the frequency of communication with the audit committee, and other variables" (p. 142).

[3] Audit fees reflect the joint outcome of both supply and demand factors. In a working paper, Gao et al. (2015) also document significant increases in audit fees post violation. They characterize the phenomenon as an auditor-driven response in anticipation of increased litigation risk post violation, improved bargaining power in audit fee negotiations, or both. We address these supply-based explanations in Section 5.

most important client competencies. In the context of covenant violations, the increased demand for audit services is likely to manifest through the responses of the audit committee to the violation. Consistent with this notion, we find evidence of improved audit committee independence and diligence post violation, suggesting that covenant violations increase the demand for audit services.

We augment our analysis of covenant violations' effect on the level of audit services by examining the cross-sectional variations in the audit fee increases post violation. We find that increases in audit fees following covenant violations are more pronounced when 1) financial covenants are used more heavily in the debt contract, 2) the covenant being violated represents a performance covenant—the type of trip wire covenants that limit agency problems via the transfer of control to lenders in certain states of the world—and 3) a waiver is not immediately granted and thus the violating firm faces more intensive lender interventions post violation. These results demonstrate the link between the mechanisms designed to control agency costs in debt contracts and the observed audit fee increases, suggesting that the increased demand for audits is driven by the need to mitigate heightened agency problems post violation.

To shed more light on the link between increased audit verification post violation and the incentives to control agency costs, we investigate whether higher levels of verification help mitigate the increase in contracting costs post violation.[4] Consistent with our expectation, we find that the observed audit fee increases are associated with more favorable movements in borrowing costs. Specifically, for firms paying the median interest rate, violating firms that experience an increase in audit fees will need to pay an interest rate of 11 basis points more than the pre-violation interest rate. In contrast, violating firms that do not experience an

[4] We thank an anonymous referee for encouraging us to examine the implications of increased audit verification following covenant violations.

increase in audit fees will have to pay an interest rate of 25 basis points more than the pre-violation rate. These interest rate implications are economically significant.

Further analysis suggests a channel for the higher audit verification standard to exert influence on borrowing costs faced by the firm post violation. Previous research provides substantial evidence on the role of investment restrictions in controlling managerial agency risk and reducing contracting costs in debt financing (Chava and Roberts 2008; Chava et al. 2010; Nini et al. 2009, 2012). Consistent with this notion, we find evidence of tighter investment policies following covenant violations. Moreover, we link this shift in investment policies with changes in the level of audit verification by showing that the adoption of more conservative policies is more pronounced for firms that experience an increase in audit fees post violation. These findings suggest that one channel through which higher levels of audit verification can help mitigate the increases in borrowing costs post violation is by enabling better monitoring to curb managerial overinvestment.

Finally, we conduct additional tests to address the supply-based explanations for the observed audit fee increases, namely, higher auditor litigation risk and a more favorable bargaining position for the incumbent auditor following covenant violations. We do not find evidence that supports these supply-based explanations. Nevertheless, our findings cannot rule out the possibility that supply-side factors may contribute to the audit fee increases.

This study adds to the line of literature that documents the role of audit verification in mitigating the moral hazard problems arising from the information asymmetry between managers and outside investors (DeFond and Zhang 2014; Shivakumar 2013). Our results are consistent with debt covenant violations increasing the demand for audit services to control the heightened agency problems in the resolution process. The findings add to evidence that external auditors contribute to corporate governance, especially when managerial agency problems are likely to be severe (Fan and Wong 2005). Our findings also complement the

emerging literature arguing that changes in firm governance in response to debt covenant violations can boost firm value (Chava and Roberts 2008; Chava et al. 2010; Nini et al. 2009, 2012).[5]

The remainder of this paper proceeds as follows. The next section develops the research hypotheses. Section 3 describes the sample construction process and our data. Section 4 presents the results of the hypothesis tests. Section 5 addresses supply-based explanations for the observed audit fee increases following covenant violations. Section 6 concludes.

2. Hypothesis development

2.1. Effect of covenant violations on audit fees

There are several reasons that make it difficult to argue for changes in audit fees following covenant violations. Given the extensive evidence that debt covenant violations are common and most violating firms are well outside of payment default states (Dichev and Skinner 2002; Gopalakrishnan and Parkash 1995; Nini et al. 2012), covenant violations are unlikely to augur financial distress that warrants higher audit fees. Moreover, the reporting of a covenant violation suggests audit effectiveness to the extent that financial reports are informative enough to indicate the occurrence of the violation. Therefore it is unclear why audit fees should change following covenant violations.

On the other hand, there are reasons to expect changes in the level of audit verification following covenant violations, once we take into consideration the dynamics of contracting with heightened agency problems. As discussed earlier, research shows that technical violations serve as an early warning of heightened managerial agency risk and are often followed by changes in firm governance to address these agency problems. In addition, renegotiations following covenant violations will lead to states unanticipated in the initial

[5] Earlier research on the consequences of debt covenant violations (e.g. Beneish and Press 1993, 1995; DeFond and Jiambalvo 1994; Sweeney 1994) document negative impacts of covenant violations.

contract that require closer monitoring of the accounting outcomes, which further increases the need to mitigate agency conflicts. The auditing literature concludes that the need to control agency risk drives the demand for audit verification (DeFond and Zhang 2014). Given this link between agency conflicts and the demand for audits, debt covenant violations will heighten the governance role of external auditors and increase the demand for their services. We empirically test our proposition using audit fees as a proxy for the level of audit verification chosen by the client (Ball et al. 2012; DeFond and Zhang 2014). Thus we hypothesize:

H1: Debt covenant violations lead to increases in audit fees.

2.2. Effect of covenant violations on audit committees

Previous research shows that greater demands for high quality audits lead to the development of client competencies, which consist of governance mechanisms that help achieve the level of audit verification desired by the client (DeFond and Zhang, 2014). Audit committees represent one of the most important client competencies. In corporate governance, audit committees are considered "the ultimate monitor" of financial reporting (NYSE and NASD 1999, page 7). In exercising their oversight, the audit committee selects and monitors the external auditor to achieve the desired level of audit verification.

In the context of covenant violations, the heightened demand for higher quality audit services is likely to manifest through the responses of audit committees. Thus we examine audit committee characteristics to capture this increased demand following covenant violations. Specifically, we focus on the independence and diligence of audit committees, as previous research shows that these characteristics matter for debt contracts (Anderson et al., 2014). Thus we hypothesize:

H2a: Audit committee independence improves following covenant violations;

H2b: The frequency of audit committee meetings increases following covenant violations.

2.3. Drivers of the increased demand for audit

In this section, we develop hypotheses based on the agency framework to illuminate the drivers of the heightened demand for audit services following covenant violations. According to the contracting efficiency hypothesis, contracting parties trade off different mechanisms designed to control managerial moral hazards. Thus financial covenants are more likely to be used when they are more cost effective than alternative mechanisms (Chava et al. 2010). Along the same lines, Costello and Wittenberg-Moerman (2011) find that lenders will rely more on accounting-based covenants when the accounting information is more useful in portraying firm performance and credit risk. Consistent with this notion, we argue that covenant violations will lead to a demand for higher levels of audit services when financial covenants are used more heavily in the contract prior to violation. In other words, we expect the increase in demand for audit verification post violation to be positively associated with the ex ante demands for accounting information, as reflected in the use of financial covenants in the debt contract. Thus we hypothesize:

H3a: Post-violation audit fee increases are more pronounced for debt contracts with high levels of reliance on financial covenants than for those with low levels of reliance on financial covenants.

Previous research shows that covenants based on different accounting ratios mitigate agency costs through different mechanisms (Cristensen and Nikolaev 2012; Demerjian 2011). Cristensen and Nikolaev (2012) divide financial covenants into two categories: 1) capital covenants (C-covenants) that control the conflicts of interest between lenders and borrowers by directly limiting the level of debt in the borrower's capital structure and 2) performance covenants (P-covenants) that mitigate agency problems by acting as trip wires that transfer control to lenders to restrict suboptimal managerial actions in certain states of the world. Building on the differing roles of C-covenants and P-covenants, we argue that the audit fee

response to a covenant violation will depend on the type of covenant violated. We predict that violations of P-covenants lead to transfer of control to lenders and, consequently, a demand for higher levels of audit verification to facilitate the increased monitoring of managers. In contrast, violations of C-covenants are less likely to trigger such an effect, as they do not rely on ex post allocation of control as a mechanism to address agency risk. Thus we hypothesize:

H3b: Post-violation audit fee increases are more pronounced for violations of performance covenants (P-covenants) than for those of capital covenants (C-covenants).

As discussed earlier, previous research shows that covenant violations rarely lead to acceleration of the loan. Instead of demanding immediate payments, creditors facing a covenant violation typically choose to either waive the violation or to restructure and tighten the terms of the loan through renegotiation. A waiver reported in SEC filings indicates that the technical violation has been resolved by the end of the reporting period (Roberts and Sufi 2009). Thus, when a waiver is not granted, a covenant violation is more likely to result in additional contractual restrictions on the borrowing firm and more intense lender intervention. To the extent that the audit fee responses to covenant violations are driven by the need to mitigate agency problems and facilitate lender intervention post violation, we expect covenant violations without a waiver to result in steeper audit fee increases. Therefore we test the following hypothesis:

H3c: Post-violation audit fee increases are more pronounced for violations that are not granted a waiver during the violation year than for those that receive an immediate waiver.

2.4. Implications of more intensive auditing

Our predictions so far build on the idea that the incentives to mitigate agency conflicts drive the increased demand for auditing following debt covenant violations. Our next prediction concerns whether the increased level of audit verification actually serves to limit agency problems following covenant violations. As debt covenant violations represent states

of the world in which heightened conflicts of interest warrant the transfer of control to lenders, we expect the borrowing costs to increase following a violation. According to contract theory, mechanisms that help control agency problems will reduce contracting costs. Therefore we argue that higher levels of audit verification following covenant violations can help mitigate the unfavorable movements in borrowing costs by improving contract efficiency. Thus we hypothesize:

H4a: Violating firms that experience an increase in audit fees following covenant violations face less steep increases in borrowing costs post violation than violating firms that do not experience an increase in audit fees.

We further explore a potential channel through which audit verification can influence violating firms' borrowing costs post violation. As theory posits that audit verification adds value by facilitating the monitoring of managers (Watts and Zimmerman 1983), we examine the link between audit fee increases and evidence of changes in managerial behavior. Previous research provides substantial evidence on the role of investment restrictions as a key mechanism to constrain value-reducing managerial behavior and control contracting costs in debt financing (Chava and Roberts 2008; Chava et al. 2010; Nini et al. 2009, 2012). The findings from this line of research indicate that lenders impose tighter restrictions on investment activities following covenant violations to limit managerial moral hazard problems. Consistent with this notion, we argue that higher levels of audit verification can help limit the heightened agency conflicts post violation by enabling better monitoring to curb managerial overinvestment. Thus we hypothesize:

H4b: Violating firms that experience an increase in audit fees following covenant violations exhibit a more pronounced shift to conservative investment policies post violation than violating firms that do not experience an increase in audit fees.

3. Data

3.1. Sample construction

We start our sample collection from the merged Compustat-Audit Analytics dataset. For each observation in the merged sample, we collect accounting information from Compustat and auditor/audit fee information from Audit Analytics.[6] We then match the merged dataset with the Reuters Loan Pricing Corporation's Dealscan database using the DealScan-Compustat link file constructed by Chava and Roberts (2008). This ensures that our sample excludes firms that have never borrowed since year 1987, as Dealscan started recording bank loans in 1987. We then merge this sample with the comprehensive dataset of covenant violations used by Roberts and Sufi (2009) and Nini et al. (2012).[7] Finally, we exclude all financial firms and utility firms (SIC codes 6,000–6,999 and 4,900–4,999, respectively) from the sample.

To identify the treatment effect of violations, we construct a sample of control firms based on propensity-score matching. Specifically, we regress the dummy variable of being a violating firm on firm characteristics that potentially influence the likelihood of covenant violations as following:

$$\begin{aligned} Violation_{it} = {} & LN(Assets)_{it} + LN(Segment)_{it} + Foreign_{it} + ROA_{it} + Loss_{it} + InvRec_{it} \\ & + Leverage_{it} + Market - to - Book_{it} + Current\ Ratio_{it} \\ & + Quick\ Ratio_{it} + SP\ Rating_{it} + Fraud\ Risk_{it} + BIG4_{it} + Specialist_{it} \\ & + Busy_{it} + Delay_{it} + Going\ Concern_{it} + SOX_{it} + e_{it}. \end{aligned} \quad (1)$$

[6] Note that fees for due diligence performed by external auditors related to loan initiation are part of non-audit fees and therefore not included in audit fees.

[7] The dataset can be downloaded from http://faculty.chicagobooth.edu/amir.sufi/data.html. Violations are not clustered in any given year. The percentage of firms reporting a covenant violation in our sample for 2000 through 2007 is 14%, 17%, 14%, 11%, 11%, 12%, 11%, and 10%, respectively.

We use a probit model to estimate this regression for all firms in our Dealscan-Compustat-Audit Analytics sample from 2000 to 2007.[8] The estimated coefficients are used to calculate the propensity score for each firm. The nonviolating firms with the closest propensity score of the violating firms are identified as the control firms. This process yields a common support sample consisting of 1,592 violating firms and 1,214 control firms identified based on propensity-score matching.

Table 1 Panel A reports the descriptive statistics for the common support sample. All the dollar value variables in Table 1 have been converted to constant 2006 U.S. dollars using the U.S. Bureau of Labor Statistics (BLS) CPI series as deflator. The mean and median of audit fees are \$0.754 million and \$0.258 million, respectively. The mean firm size is about \$1.25 billion, and the median firm in our sample has total assets of \$148 million. The median and mean of *Foreign* are 0 and 0.1 respectively, suggesting that about 10% of the firms have significant foreign operations. Table 1 Panel B reports the descriptive statistics of the firm characteristics for the violating and matched nonviolating firms in the common support sample.

[Insert Table 1 here]

3.2. Violation indicators

We create a sequence of dummy variables (*Pre*, *Event*, *PostY1*, *PostY2*, and *PostY3*) to capture the distance to the violation for violating firms. For firm-year observations that represent a violating firm, *Event* indicates the violation year (the year that the firm reported a covenant violation). *Pre* indicates the year immediately before the violation year. *PostY1*, *PostY2*, and *PostY3* indicate the year immediately following the violation year, two years

[8] Our sample period starts from year 2000 because audit fee data became available starting year 2000. Nonetheless, we still keep the covenant violations recorded between year 1996 and 1999 to minimize the truncation problem.

after the violation year, and three years after the violation year, respectively. Nonviolating firms have zero values for all the violation dummy variables.

3.3. Control variables

We include factors that have been shown to affect audit fess as control variables in our analysis. (See Appendix Table 1 for variable definitions.) Consistent with previous literature, the control variables cover auditee size, complexity, operating performance, growth potential, leverage level, S&P credit ratings,[9] liquidity status, auditor characteristics, and audit outcomes (Bell et al. 2001; Doogar et al. 2010; Francis et al. 2005; Hay et al., 2006; O'Keefe et al. 1994; Simunic 1980). As our sample period spans from 2000 to 2007, we include an additional indicator variable to control for the effect of Section 404(b) of the Sarbanes-Oxley Act. It is set to one if the firm is an accelerated filer (filer status reported in Audit Analytics) and the year is 2004 or later and zero otherwise.[10] The inclusion of this variable is important, as Section 404(b) of the Sarbanes Oxley Act expands the scope of auditing by requiring auditors to evaluate the effectiveness of the internal controls, which can significantly influence audit fees.

We also include a measure of auditee accounting risk as a control variable. Gao (2015) argues that covenant violations may increase managers' incentives to bias financial reporting to avoid further violations, which in turn results in higher audit fees. This argument is inconsistent with the conclusion from previous research that managers' incentives to avoid debt covenant violations are diminished once an initial violation occurs (Dichev and Skinner 2002). Nevertheless, we include an indicator of auditee accounting risk (*Fraud Risk*) from

[9] The majority of firms in our sample are not rated by S&P and thus do not have credit ratings. To maintain the sample size, we assign *SP rating* a value of zero for all observations that represent nonrated firms in our regression analyses. We have run the regressions excluding *SP rating* as an independent variable, and all inferences remain the same.

[10] Filing both the management report on internal controls (required under Section 404(a)) and the auditor attestation of this management report (required under Section 404(b)) went into effect starting fiscal year 2004 for accelerated filers, while non-accelerated filers were never subject to the requirement of Section 404 (b).

Doogar et al. (2010) as a control variable in our model. This measure captures the level of the accounting fraud risk calculated based on various items reported in the balance sheet and income statement. We provide detailed descriptions of this measure and other control variables in Appendix Table 1.

4. Empirical Model and Tests

4.1. Audit fees: Testing of H1

We examine whether covenant violations lead to higher audit fees. To identify the treatment effect, we use the control group of nonviolating firms in the common support sample described earlier as the benchmark to examine how covenant violations affect audit fees. Specifically, we estimate the following regression by ordinary least squares (OLS), based on the common support sample consisting of the violating firms and the matched control firms during the period 2000–2007.

$$\begin{aligned} LN(Audit\ Fee)_{it} &= Violation\ Indicators\ \{Event, PostY1, PostY2, PostY3\}_{it} \\ &+ LN(Assets)_{it} + LN(Segment)_{it} + Foreign_{it} + ROA_{it} + Loss_{it} \\ &+ InvRec_{it} + Leverage_{it} + Market - to - Book_{it} + Current\ Ratio_{it} \\ &+ Quick\ Ratio_{it} + SP\ Rating_{it} + Fraud\ Risk_{it} + BIG4_{it} + Specialist_{it} \\ &+ Busy_{it} + Delay_{it} + Going\ Concern_{it} + SOX_{it} + \delta_i + \delta_t + e_{it}. \end{aligned} \quad (2)$$

[Insert Table 2 here]

The dependent variable is the natural logarithm of audit fees (in thousand USD) paid by firm i in year t. δ_i and δ_t are firm- and year-specific fixed effects, respectively. The parameters of interest are coefficients for the series of violation indicators, i.e., *Event*, *PostY1*, *PostY2*, and *PostY3*. They can be considered as interaction terms between an indicator of treatment firms and an indicator in each of the (post-) treatment periods. These parameters

capture the average effect of the debt covenant violations on audit fees for violating firms compared with nonviolating firms. By controlling for year and firm fixed effects, this difference-in-differences (DID) framework controls for unobserved differences across years that are common to all firms and time-invariant unobserved differences between violators and nonviolators.[11] The identifying assumption is that the change in audit fee changes before and after the violation would have been the same for both the violating (treatment group) and nonviolating firms (control group) in the absence of the violation.

Table 2 Panel A reports the results on audit fee responses to covenant violations. Column 1 of Table 2 Panel A reports the effect of covenant violation on audit fees during the violation year. Columns 2 through 4 report the effect of covenant violations on audit fees one, two, and three years after the violation respectively. Column 5 reports a dynamic model that jointly includes the four violation or post-violation indicator variables (*Event, PostY1, PostY2*, and *PostY3*) to examine the cumulative effect of violations on audit fees.

The results in Table 2 Panel A suggest that covenant violations are associated with higher audit fees during the violation year and up to three years following the violation. The effects are both statistically and economically significant. In particular, column 5 of Panel A of Table 2 indicates that, using the matched sample of non-violating firms as the benchmark group, violating firms experience an increase in audit fees of 8.39%, 10.87%, 8.85%, and 5.21% during the violation year, the year immediately following the violation, two years afterward, and three years afterward, respectively, compared with the pre-violation years. Overall, the results reported in Table 2 Panel A suggest that audit fees increase immediately

[11] A standard DID framework only controls for the simple difference between the treatment and control groups as well as before and after the treatment. Our model provides an extension of this standard DID framework by controlling for more flexible year and firm fixed effects. This method allows for the difference between the treatment and control groups to vary between firms and for the difference before and after the treatment to vary across years.

following the reporting of a violation and the higher fees persist for three years after the initial violation.

As reported in Table 2 Panel A, the overall goodness of fit for each of the regression models is comparable to previous research. (The adjusted R^2 is around 0.6 in each case.) The results for the control variables are largely consistent with those reported in the literature. Most notably, audit fees are positively associated with control variables that proxy for size (*LN(Assets)*), complexity (*LN(Segment)*), and delay in financial reporting (*DELAY*). Consistent with our expectation, the coefficient on *SOX* is around 0.4 and statistically significant ($p<0.01$) in each model, suggesting that accelerated filers in the post-SOX period face significantly higher audit fees. The results are consistent with the findings compiled by Audit Analytics that accelerated filers experienced a spike in audit fees in 2004 due to the implementation of Section 404 (b) of the Sarbanes-Oxley Act (Audit Analytics 2011).

To better account for both potential endogeneity and intertemporal variation in the outcome variable, we combine the DID analysis and propensity-score matching based on the empirical specification of Kirk (2011). Specifically, we test for changes in audit fees by examining the difference between one year before the violation (year *t-1*) relative to the violation year (year *t*) for the violating firms (i.e., treatment group), subtracted by the audit fees paid by matched control group during year [*t-1*, *t*].

Table 2 Panel B presents the results for the DID analysis. Columns 1 and 2 show the mean level of audit fees one year before the event *t-1* (column 1) and the event year *t* (column 2) for both the treatment and the matched control groups. In column 3, *Difference* is the mean difference of audit fees during year [t-1, t], and *Diff-in-Diff* is the difference between before and after the violation, after the mean level of audit fees have been adjusted relative to the matched control group. Column 4 shows the associated *p*-value of data in column 3. We focus on *Diff-in-Diff* results using the propensity-score matching (column 3). Consistent with

our regression analysis, we find an increment of audit fees after covenant violations. This result (6% increase) is not only statistically significant but also economically comparable to what we find in the panel data analysis (column 1 of Table 2 Panel A).

We conduct additional tests to check the robustness of our results. First, we examine whether our results are sensitive to the choice of the propensity-score matching method in the selection of the control firms. Appendix Table 2 reports the results on the propensity-score matching analysis using different techniques (nearest neighbor matching, radius matching, and stratification matching). Overall, the matching analysis corroborates the robustness of the audit fee regression findings.

Second, we use an alternative method to estimate the effect of covenant violations on audit fees. Specifically, we estimate the industry-specific "normal" audit fees in pre-violation years and compute the "abnormal" audit fees post violation to identify the incremental effect of covenant violations on audit fees. For each two-digit SIC industry, we estimate the industry-specific normal audit fees by fitting the regression of audit fees in the pre-violation period on the control variables. We then apply the estimated parameters to calculate the normal audit fees during the post violation years. Industry-adjusted abnormal audit fees are calculated as the difference between the observed and the estimated normal audit fees.

Appendix Table 3 reports the results on the abnormal audit fees following covenant violations. The difference between the observed audit fees (column 4) and the estimated normal audit fees (column 3) represents the industry-adjusted abnormal audit fees. We conduct *t* tests to examine whether the abnormal audit fees are significantly different from zero and report the results in column 5. As shown in Appendix Table 3, the industry-adjusted abnormal audit fees are consistently positive and statistically different from zero during the violation year and until three years after the violation. Thus the results provide further support for our earlier findings that covenant violations result in higher audit fees.

Finally, we perform sensitivity tests to examine whether our results are robust to controlling for other changes in response to covenant violations that can have implications for audit fees. The first factor we consider is CEO turnover, as Nini et al. (2012) show that covenant violations increase the incidence of CEO turnover. Given that previous research shows that CEO turnover is associated with higher audit fees (Huang et al., 2014), we examine whether our results are robust to accounting for the potential effect of CEO turnover. Specifically, we add the main effect of CEO turnover as well as the interaction effect of CEO turnover and our violation indicator variable as additional controls to our regression analysis. The results (not tabulated) do not alter our conclusion that covenant violations result in higher audit fees. Another factor we consider is potential increases in write-offs/impairments, given that Tan (2013) documents increased write-offs after covenant violations. The results (not tabulated) show that all inferences remain the same after controlling for this effect.

4.2. Audit committees: Testing of H2

H2a and H2b predict that audit committee independence and diligence will improve in response to the heightened demand for higher levels of audit services following covenant violations. We empirically test these predictions by examining the changes in audit committee independence and the frequency of audit committee meetings post violation. Similar to the test of H1, the analysis is based on the common support sample, which consists of violation firms and the matching group of nonviolating firms described earlier.

The audit committee's membership information is obtained from RiskMetrics. When this information is not directly available from RiskMetrics, we manually search the firm's proxy statement. We use the absolute number of outside directors on the audit committee to capture

the level of audit committee independence.[12] We hand-collect information on the number of audit committee annual meetings from the firm's proxy statement.

We examine the audit committee characteristics up to three years after covenant violations. We also include the violation indicator variable, *PreY1*, to capture any possible pre-responses to the violation. When constructing the baseline model for audit committee independence and the frequency of audit committee meetings, we retain some of the control variables in the audit fee model discussed earlier and incorporate other control variables from previous research on audit committees (Klein 2002; Raghunandan and Rama 2007; Sharma et al. 2009).

[Insert Table 3 here]

Columns 1 and 2 of Table 3 report results on audit committee independence and meeting frequency, respectively. We find evidence of improved audit committee independence one year after debt covenant violations. Specifically, the coefficient on *PostY1* is positive and statistically significant in the regression on audit committee independence reported in column 1. The results on audit committee meetings reported in column 2 indicate that audit committees meet more frequently in response to debt covenant violations, with the coefficients on *PostY1* and *PostY2* being statistically significant. We note that the insignificant coefficient on *Event* is expected, given that it is difficult to change audit committees immediately after a violation, and thus we expect a time lag before changes begin to be reflected in the data.

Overall, the results reported in Table 3 present evidence that audit committees become more independent and active during the post-violation period. As the audit committee has the

[12] NYSE and NASDAQ modified their listing requirements in December 1999. The new standards require firms to maintain audit committees composed solely of outside directors. As a result, the majority of firms in our sample (with the sample period of 2000 to 2008) have audit committees composed of 100% outside directors. However, this does not mean that there is no variation in the level of audit committee independence after 2000. In particular, the absolute number of outside directors on the audit committee is also an important determinant of independence. This notion is behind the modified NYSE and NASDAQ listing standards requiring that all firms must maintain audit committees with at least three independent directors.

responsibility to review with the external auditor the scope of audit work and audit fee, the findings suggest a link between the demand for audit verification and the audit fee response following debt covenant violations. The results add to evidence from previous research that greater demands for auditing lead to the development of better mechanisms to achieve the desired level of verification.

4.3. Drivers of the increased demand for audit: Testing of H3

In this section, we examine the cross-sectional variations in changes in audit fees following covenant violations to illuminate whether the demand effect drives the observed audit fee responses. For this purpose, all the analyses in this section are based on the sample of violators only. We use the same set of control variables discussed earlier to account for other known determinants of audit fees.

H3a predicts that the increase in demand for audit verification post violation will be positively associated with the ex ante demand for accounting information as reflected in the use of financial covenants in the debt contract. To test this prediction, we retrieve from Dealscan the most recent loan initiated by the violating firm prior to the violation.[13] We then obtain information on the use of covenant violations in the loan contract if such information is available in Dealscan. By doing so, we can retrieve information on covenant structure for 729 violating firms. Among these firms, the median number of financial covenants is two. Thus we partition the violating firms into two groups based on the level of reliance on financial covenants: the high-reliance group (more than two financial covenants in the debt contract) and the low-reliance group otherwise. We then run audit fee regressions for the groups separately.

[Insert Table 4 here]

[13] The SEC filings disclosing a covenant violation typically do not identify the specific loan in technical violation. This complicates the process of linking the violation with the loan records reported by Dealscan (Demiroglu and James 2010).

Panel A of Table 4 presents evidence on the moderating effect of the level of the debt contract's reliance on financial covenants. The variable of interest is *Event*, the dummy variable that indicates the violation year. The results show that the coefficient on *Event* is 0.0865 and statistically significant for the high-reliance group (column 1), while the coefficient on *Event* for the low-reliance group is 0.0008, being statistically indistinguishable from zero (column 2). Thus the results show that the audit fee increases following covenant violations are significantly higher for the high-reliance group than the low-reliance group. The findings support H3a by showing that the observed audit fee increases following covenant violations are concentrated among violators that rely heavily on financial covenants in the debt contract prior to violation.

Next, we test H3b using a similar method. H3b predicts that the effect of covenant violations on audit fees varies with whether the covenant being violated is a capital covenant (C-covenant) or a performance covenant (P-covenant). Our categorization of P-covenant and C-covenants is consistent with that of Christensen and Nikolaev (2012). Specifically, P-covenants include the interest coverage ratio, fixed charge coverage ratio, debt service coverage ratio, cash flow coverage ratio, debt to EBITDA, senior debt to EBITDA, and EBITDA. C-covenants include debt to tangible net worth, leverage ratio, debt to equity ratio, loan to value, senior leverage, current ratio, quick ratio, tangible net worth, net worth, and capex.

Panel B of Table 4 reports the results of the tests that examine how the audit fee changes following covenant violations vary with the types of covenants being violated. To identify the types, we examine the SEC files in which the violation was identified from the EDGAR database (per Sufi's online dataset link: http://faculty.chicagobooth.edu/amir.sufi/data.html) and record the types of covenants if the information is available. The hand-searching process yields information on the types of covenants being violated for 683 violations (by 604 firms).

We then divide these violations into two groups based on whether a P-covenant has been violated.

Column 1 in Panel B of Table 4 presents the audit fee regression results for the violating firms that have violated at least one P-covenant. Column 2 presents the audit fee regression results for the violating firms that have only violated C-covenants. The results show that the coefficient on *Event* is positive and statistically significant for the firms that have violated at least one P-covenant. In contrast, the coefficient on *Event* is statistically indifferent from zero for firms that have only violated C-covenant. The results support H3b by showing that the observed audit fee increases following covenant violations are more pronounced for violations of P-covenants than violations of C-covenants.

We then test H3c by examining how the effect of covenant violations on audit fees varies with whether a waiver is granted during the violation year. We scanned the violating firms' annual reports and manually collected information regarding whether a waiver was received upon violation. Out of the 1,449 violating firms with available information from annual reports, 944 firms received a waiver upon violation and 505 firms did not. Then we partition the violating firms into two groups based on whether a waiver is granted during the violation year and run audit fee regressions for the two groups separately.

As reported in Panel C of Table 4, the results show that the coefficients on *Event* are positive and statistically significant for both groups of violators. However, the magnitude of the coefficient is noticeably larger for violators that have not received a waiver during the violation year (0.0493 vs 0.0316).[14] This is consistent with H3c by showing that covenant violations without an immediate waiver lead to steeper audit fee increases post violation.

4.4. Implications of more intensive auditing: Testing of H4

[14] We formally test the statistical significance of the difference between the two coefficients using an interaction-term approach in a pooled regression. The results confirm that the effects of covenant violations on audit fees are larger for the nonwaiver group than for the waiver group.

According to the principles of contract theory, mechanisms that help control agency problems will reduce contracting costs. We investigate whether the increased level of audit verification helps limit agency problems by examining whether the pattern of audit fee changes is associated with movements in borrowing costs post violation. All the analyses in this section are based on the sample of violating firms only.

To identify the movements of borrowing costs around covenant violations, we obtain from Dealscan the loan spread from the most recent loan initiated before the covenant violation and from the first loan initiated within three years after the violation respectively. For the identified loans, we require information on interest rates and other loan characteristics, including loan maturity, loan size, loan types, number of lenders, whether it is a term loan, and collateral information from Dealscan. This process produces pair loans for 649 violations.

Panel A of Table 5 presents evidence on how auditing moderates the changes in borrowing costs following covenant violations. To identify the implications of different levels of audit verification, we partition the violation firms into two groups based on whether the firm experiences increases in audit fees post violation. The dependent variable of the analyses reported in Panel A of Table 5 is the natural logarithm of the loan spread (loan interest rate over LIBOR). The variable of interest is *Post-Violation*, a dummy variable indicating whether the loan spread is from the pre- or post-violation period. We include a battery of control variables that have been shown to influence loan spread (e.g., Graham, Li and Qiu 2008). Specifically, we control for loan size, whether the loan is a term loan, loan maturity, number of lenders, whether the loan includes a performance-pricing provision, whether the loan is backed by collaterals, firm size (natural logarithm of total assets), market to book ratio, leverage, ROA, cash flow volatility, tangibility of assets (net PP&E divided by total assets),

Altman Z-score as a measure of financial distress, and bankruptcy risk (a high Z-score indicating safe zone with low stress).

We regress the dependent variable *Loan Spread* on *Post-Violation* and the control variables for violating firms that experience audit fee increases following covenant violations and the other group of violating firms separately. As reported in column 1, the coefficient on *Post-Violation* is 0.0485 and statistically significant, indicating that borrowing costs increase by roughly 5% following covenant violations for violating firms with an audit fee increment. The coefficient on *Post-Violation* reported in column 2 is 0.1118 and statistically significant, suggesting that borrowing costs are 11% higher following covenant violations for violating firms that do not experience audit fee increases post violation.

The above results reported in Panel A of Table 5 show that the increase in borrowing costs for violating firms that pay higher audit fees post violation is about half of the magnitude of the increase in borrowing costs for violating firms that do not experience increases in audit fees post violation, consistent with H4a. The sample median of loan interest rate is 225 basis points for both groups. This means that for firms paying the median interest rate, violating firms that experience increases in audit fees will pay an interest rate 11 basis points higher than the pre-violation interest rate. In contrast, violating firms that do not experience increases in audit fees will pay an interest rate 25 basis points higher than the pre-violation rate. Overall, the results suggest that higher levels of audit verification help moderate the increases in borrowing costs following covenant violations, supporting H4a.

[Insert Table 5 here]

Next, we turn to the testing of H4b, which predicts that higher levels of audit verification can limit agency problems by helping reinforce restrictions on managerial overinvestment. . Panel B of Table 5 reports the tests that examine this prediction. Following Nini et al. (2012), we use capital expenditures (columns 1–2) and acquisitions (columns 3–4) to proxy for

investment conservatism. (Increased investment conservatism is indicated by a decline in capital expenditures and acquisitions.) To investigate the moderating effect of audit fee changes on changes in investment conservatism, we regress each proxy of investment conservatism on the violation indicators (*Event* and *PostY1*) for the group of the violating firms that have experienced higher audit fees following the violation and the other group separately. We examine the moderating effect during the event year (*Event*) and the year immediately following the violation year (*PostY1*) because we expect a time lag before the impact of audit fee changes begins to play out. We also follow Nini et al. (2012) by including the corresponding control variables in our regression models.

The results in Panel B Table 5 support H4b by showing that the violating firms experiencing increases in audit fees post violation can better curb managerial overinvestment in the form of excessive capital expenditures and acquisitions (columns 1 and 3) than the rest of violating firms (columns 2 and 4). The findings suggest a channel through which audit verification can contribute to corporate governance following covenant violations. That is, increased auditor monitoring helps boost lender interventions aimed to restrict value-reducing managerial behavior, which in turn limits the agency conflicts. Such changes in firm behavior can help explain the results from the testing of H4a reported in Panel A Table 5, which show that higher levels of audit verification mitigate the increases in borrowing costs following covenant violations.

5. Supply-based explanations

5.1 Litigation risk and audit fee responses

While our findings so far suggest that the increased demand for audit verification drives the increases in audit fees following covenant violations, it is important to note that audit fees reflect the joint outcome of both supply and demand factors. In a working paper, Gao et al.

(2015) also document significant increases in audit fees following covenant violations. They characterize the phenomenon as an auditor-driven response in anticipation of increased litigation risk post violation, improved bargaining power in audit fee negotiations, or both. This section addresses these explanations.

Both anecdotal evidence and findings from empirical research show that lawsuits against auditors often follow sharp declines in stock prices (Shu, 2000). This is the basis for the argument that links covenant violations with increased auditor litigation risk, as proposed by Gao et al. (2015).[15] The assumption underlying this argument is that covenant violations can trigger large drops in stock prices that lead to increased shareholder lawsuits, including lawsuits against the external auditor. Consistent with this notion, we use the short-window cumulative abnormal return (CAR) surrounding the announcement of the violation to proxy for auditor litigation risk associated with covenant violations.

We use the report date of EDGAR files (10-Ks or 10-Qs) that first disclose the violation information as the announcement date because most firms do not disclose the occurrence of covenant violations until required to do so at the filings of 10-Ks or 10-Qs. For each announced violation, we compute the firm's three-day cumulative abnormal return (CAR) centered on the violation announcement date. In our sample, the mean and median of CAR is 0.01, with standard deviation 0.21. We categorize a firm as a *negative CAR firm* if it ever experiences negative CAR during the seven-day violation period and zero otherwise. In our sample, about 58% of firms are negative CAR firms.

[Insert table 6 here]

Table 6 presents results of analysis of whether auditor litigation risk drives audit fee responses to covenant violations. For this purpose, the analyses are based on the sample of violating firms. We partition the violating firms into two groups based on whether they

[15] To the best of our knowledge, there is no direct empirical evidence indicating an association between debt covenant violations and increased lawsuits against the engaged auditor.

experience negative CAR around the violation announcement date. Columns 1 and 3 in Table 6 report the results of the audit fee regressions for the high-litigation risk group (violating firms that experience a negative CAR around the violation announcement date). Columns 2 and 4 report the results of the audit fee regressions for the low-litigation risk group (nonnegative CAR around the violation announcement date). In columns 1–2 of Table 6, we incorporate the *Event* indicator only. In columns 3–4 of Table 6, we incorporate a series of violation indicators to show the dynamic effects of covenant violation on audit fee changes, where audit fee is modelled by the event year and lagged years from one to three years after the violation.

If litigation risk is the primary driver of the effect of covenant violations on audit fees, we expect the audit fee increases to be concentrated among violators that experience stock value declines post violation as these firms face higher litigation risk due to drops in stock prices. The results reported in Table 6 do not support this prediction. The results in columns 2 and 4 indicate that, for violating firms that do not experience any negative stock returns at the announcement of the violation and, audit fees still increase significantly following covenant violations until at least the second year post violation. We note that violating firms experiencing negative stock returns around the violation announcement date continue to pay higher audit fees during the third year following their violations, which is not the case for the other group of violators. This result seems to suggest that auditor litigation risk may contribute to more permanent increases in audit fees post violation. On aggregation, however, our findings do not support the notion of litigation risk driving audit fee increases post violation.

5.2. Engagement of Big 4 auditors

In this section, we examine whether covenant violations lead to a higher likelihood of switching from a non-Big 4 to Big 4 auditor. Investigating the engagement of Big 4 auditors

following covenant violations can help tease out the demand-side from the supply-side effect because switches from non-Big 4 to Big 4 auditors are usually voluntary and thus are likely driven by the demand effect. Gao et al. (2015) argue that higher audit fees post violation can arise from auditor opportunism, as a covenant violation may increase the incumbent auditors' relative bargaining power with respect to audit fees. If so, violating firms should be less likely to switch from a low quality (non-Big 4) auditor to a high quality one (Big 4) post violation.

As changing auditors often incurs significant costs on the firm, a violating firm will only switch when the demand for increased monitoring following a covenant violation is particularly high. Moreover, given our earlier findings that covenant violations without an immediate waiver results in heightened demand for monitoring from creditors, we expect that these violations are more likely to result in engagement of a Big 4 auditor. On the other hand, if auditor opportunism dominates the auditor-client relationship post violation, violating firms that are not immediately granted a waiver are more likely to be locked in with the incumbent auditor and less likely to switch. Therefore it is informative to examine the pattern of the engagement with Big 4 auditors for violating firms that do not receive an immediate waiver.

[Insert Table 7 here]

Table 7 reports the results on Big 4 engagement following covenant violations. The analyses are based on the sample of violating firms. We estimate two probit models with *Engage_Big 4* (indicator variable that is coded as one if the firm switched from a non-Big 4 to a Big 4 auditor during the year and zero otherwise) as the dependent variable. The variables of interest in column 1 are *Event* and *PostY1*, which indicate the violation year and the year immediately following the covenant violation, respectively. The variables of interest in column 2 are the two interaction terms *Event*NoWaiver* and *PostY1*NoWaiver* that

capture the cross-sectional variance in the likelihood of switching from a non-Big 4 to Big 4 auditor post violation based on whether a waiver is granted during the violation year.

As reported in column 1 of Table 7, the coefficient on *PostY1* is positive and statistically significant, suggesting that covenant violations are associated with more engagement of Big 4 auditors in the year immediately following the violation. Moreover, results in column 2 show that the coefficient on the interaction term *PostY1 * NoWaiver* indicates a statistically significant positive effect of 0.0632. This suggests that violating firms that do not receive an immediate waiver are more likely to switch from a non-Big 4 to a Big 4 auditor in the year immediately following the violation year, supporting the demand-driven explanation. Overall, the patterns of engagement with Big 4 auditors documented in Table 7 are more consistent with a demand-driven switch to higher quality auditors than with a supply-based explanation based on relative bargaining power.

6. Conclusion

Agency theory suggests an important role for third-party audit verification in mitigating the agency risk faced by outside investors (Defond and Zhang 2014; Shivakumar 2013). We examine the role of auditing following debt covenant violations, the states of debt contracting characterized by the heightened managerial agency risk and a shift of control rights to lenders. We document significant increases in audit fees as well as an improvement in audit committee independence and diligence following covenant violations. Further analyses demonstrate the link between the observed fee increases and the mechanisms designed to control agency costs in debt contracts. Moreover, we find that the fee increases are associated with more favorable movements in borrowing costs and the adoption of more conservative investment policies post violation. While we acknowledge that we cannot rule out that the effect of supply-side factors, our findings are consistent with covenant violations increasing

the demand for audit verification to limit the heightened agency conflicts and mitigate increases in borrowing costs.

Our study complements evidence in the literature that financial statement verification by external auditors helps mitigate contracting costs in debt financing (Kim et al. 2011; Minnis 2011). We show that this role does not stop at a debt covenant violation but extends to the resolution process, thus providing novel evidence highlighting the importance of auditor monitoring in debt contracting. More broadly, our study comports with the view that models the corporate governance system as a dynamic web of stakeholders (Triantis and Daniels 1995). External auditors represent an important, yet understudied, stakeholder in corporate governance. Through interaction with the board (particularly the audit committee), the auditor both responds to the level of monitoring demanded and provides feedback. Despite this important role that external auditors play, there is relatively little (albeit growing) research investigating audits from the governance perspective. This study helps fill this gap by providing new evidence on the role of audit verification in the resolution process following debt covenant violations.

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Table 1 Panel A. Summary Statistics

Table 1 Panel A presents summary statistics for the common support sample. The sample consists of violating firms and control firms identified based on nearest neighborhood matching using the closest propensity score. See Appendix Table 1 for variable definitions.

Variable	N	Mean	SD	P25	Median	P75
Audit Fee (in thousands)	15131	753.6	1842.37	115.91	258	709.01
LN(Audit Fee)	15131	5.69	1.28	4.75	5.55	6.56
Event	15131	0.13	0.33	0	0	0
Assets (in millions)	15131	1253.92	6562.17	34.28	147.9	628.79
LN(Assets)	15131	5	2.1	3.53	5	6.44
LN(Segment)	15131	1.25	0.66	0.69	1.39	1.79
Foreign	15131	0.1	0.29	0	0	0
ROA	15131	-0.03	0.3	-0.04	0.05	0.1
Loss	15131	0.43	0.49	0	0	1
InvRec	15131	0.32	0.21	0.16	0.29	0.46
Leverage	15131	0.59	0.45	0.33	0.51	0.7
Market-to-Book	15131	2.4	5.03	0.9	1.72	3.09
Current Ratio	15131	0.52	0.24	0.33	0.52	0.7
Quick Ratio	15131	1.66	3.42	0.68	1.1	1.81
SP Rating	15131	2.05	4.25	0	0	0
Fraud Risk	15131	0.29	0.46	0	0	1
BIG4	15131	0.66	0.47	0	1	1
Specialist	15131	0.19	0.39	0	0	0
Busy	15131	0.69	0.46	0	1	1
Delay	15131	0.26	0.44	0	0	1
Going Concern	15131	0.09	0.28	0	0	0
SOX	15131	0.27	0.44	0	0	1

Table 1 Panel B. Treatment vs. Control Groups

Table 1 Panel B presents descriptive firm characteristics for the treatment group (violating firms) vs. the control group (non-violating firms) in the common support sample. Control firms are identified based on nearest neighborhood matching using the closest propensity score. See Appendix Table 1 for variable definitions.

	Mean		Std. Dev	
Variable	*Treatment Group*	*Control Group*	*Treatment Group*	*Control Group*
LN(Assets)	4.94	5.04	2.10	2.09
LN(Segment)	1.21	1.29	0.66	0.66
Foreign	0.09	0.10	0.30	0.29
ROA	-0.03	-0.02	0.28	0.31
Loss	0.42	0.44	0.50	0.49
InvRec	0.31	0.32	0.21	0.20
Leverage	0.59	0.59	0.44	0.48
Market-to-Book	2.36	2.44	5.06	5.00
Current Ratio	0.53	0.51	0.24	0.24
Quick Ratio	1.78	1.55	3.35	3.49
SP Rating	2.03	2.06	4.29	4.20
Fraud Risk	0.31	0.28	0.45	0.46
BIG4	0.66	0.66	0.47	0.47
Specialist	0.19	0.20	0.40	0.39
Busy	0.69	0.70	0.46	0.46
Delay	0.24	0.27	0.44	0.43
Going Concern	0.09	0.08	0.27	0.29
SOX	0.26	0.27	0.44	0.44
# of Firms	1592	1214	1592	1214

Table 2 Panel A. Covenant Violations and Audit Fees: Immediate and Long-Term Impact

Table 2 Panel A presents regression results on the effects of covenant violation on audit fees. The analyses are based on the common support sample consisting of violating firms and control firms identified based on nearest neighborhood matching using the closest propensity score. The dependent variable is the natural logarithm of audit fees in thousand U.S. dollars. All the other variable definitions are in Appendix Table 1. Reported in the parentheses are robust standard errors clustered at the firm level. *, **, *** indicate significance at the two-tailed 10%, 5% and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)
Event	0.0410***				0.0839***
	(0.0110)				(0.0135)
PostY1		0.0580***			0.1087***
		(0.0109)			(0.0152)
PostY2			0.0401***		0.0885***
			(0.0106)		(0.0145)
PostY3				0.0136	0.0521***
				(0.0109)	(0.0130)
LN(Assets)	0.3238***	0.3243***	0.3262***	0.3262***	0.3196***
	(0.0170)	(0.0170)	(0.0170)	(0.0170)	(0.0170)
LN(Segment)	0.1073***	0.1076***	0.1067***	0.1073***	0.1059***
	(0.0203)	(0.0203)	(0.0203)	(0.0203)	(0.0202)
Foreign	0.0171	0.0157	0.0164	0.0166	0.0143
	(0.0169)	(0.0169)	(0.0170)	(0.0170)	(0.0168)
ROA	-0.1510***	-0.1508***	-0.1546***	-0.1531***	-0.1519***
	(0.0358)	(0.0358)	(0.0358)	(0.0359)	(0.0355)
Loss	0.0561***	0.0578***	0.0609***	0.0611***	0.0466***
	(0.0119)	(0.0117)	(0.0118)	(0.0118)	(0.0118)
InvRec	0.1841**	0.1906***	0.1905***	0.1902***	0.1782**
	(0.0715)	(0.0715)	(0.0715)	(0.0715)	(0.0711)
Leverage	0.1369***	0.1360***	0.1364***	0.1380***	0.1294***
	(0.0275)	(0.0275)	(0.0275)	(0.0276)	(0.0271)
Market-to-Book	-0.0016	-0.0015	-0.0016	-0.0015	-0.0017
	(0.0011)	(0.0011)	(0.0011)	(0.0011)	(0.0011)
Current_Ratio	-0.1368**	-0.1399**	-0.1416**	-0.1414**	-0.1289**
	(0.0616)	(0.0618)	(0.0616)	(0.0617)	(0.0617)
Quick_Ratio	-0.0039	-0.0039	-0.0039	-0.0039	-0.0039
	(0.0032)	(0.0032)	(0.0032)	(0.0033)	(0.0031)
SP_Rating	-0.0034	-0.0032	-0.0032	-0.0034	-0.0021
	(0.0038)	(0.0038)	(0.0038)	(0.0038)	(0.0037)
Fraud Risk	-0.0093	-0.0081	-0.0099	-0.0095	-0.0069
	(0.0100)	(0.0101)	(0.0101)	(0.0101)	(0.0100)
BIG4	0.1971***	0.1965***	0.1977***	0.1977***	0.1972***
	(0.0197)	(0.0196)	(0.0197)	(0.0197)	(0.0195)

Table 2 Panel A. Covenant Violations and Audit Fees: Immediate and Long-Term Impact (Cont'd)

	(1)	(2)	(3)	(4)	(5)
Specialist	0.0224	0.0217	0.0214	0.0225	0.0174
	(0.0172)	(0.0171)	(0.0172)	(0.0172)	(0.0170)
Busy	0.1210	0.1198	0.1233	0.1228	0.1170
	(0.0864)	(0.0869)	(0.0867)	(0.0867)	(0.0866)
Delay	0.1193***	0.1210***	0.1220***	0.1217***	0.1151***
	(0.0138)	(0.0137)	(0.0138)	(0.0138)	(0.0136)
Going Concern	0.0707**	0.0674**	0.0686**	0.0695**	0.0652**
	(0.0281)	(0.0280)	(0.0280)	(0.0281)	(0.0278)
SOX	0.4414***	0.4423***	0.4416***	0.4418***	0.4400***
	(0.0243)	(0.0243)	(0.0243)	(0.0243)	(0.0241)
Firm fixed effects	yes	yes	yes	yes	yes
Year fixed effects	yes	yes	yes	yes	yes
N	15131	15131	15131	15131	15131
R-squared	0.5566	0.5572	0.5566	0.5561	0.5609

Table 2 Panel B. Propensity-Score Matching with Difference-in-Differences Analysis

Table 2 Panel B reports the results from the propensity-matching method and the DID analysis to identify the effect of covenant violations on audit fees during the violation year relative to the year before. The sample is matched using nearest neighbor propensity-score matching. Column 1 reports the mean level of audit fees one year before the violation (year *t-1*). Column 2 reports the mean level of audit fees during the event year (year *t*). *Difference* in column 3 is the mean difference of audit fees during year [t-1, t]. *Diff-in-Diff* in column 3 is the difference between before and after the violation after the mean level of audit fees has been adjusted relative to the control group using propensity-score matching. Column 4 shows the associated p-value of data in column 3.

	(1) *Before Violation*	(2) *After Violation*	(3) *Difference*	(4) *p-value (Difference)*
Treatment Group (Violating Firms)				
LN(Audit Fee)	5.58	5.69	0.11	0.02
Control Group (Nonviolating Firms)				
LN(Audit Fee)	5.65	5.70	0.05	0.58
			Diff-in-Diff	p-value (Diff-in-Diff)
			0.06	0.00

Table 3. Audit Committee Responses

Table 3 presents results on the audit committee responses to covenant violations based on the common support sample. The dependent variable in column 1 is audit committee independence, which is measured as the number of independent directors on the audit committee. The dependent variable in column 2 is audit committee diligence, which is measured as the number of audit committee meetings during the year. Other variable traits include *Loss*, *Leverage*, *Market-to-Book*, and *ROA*. Variable definitions are in the Appendix Table 1. Reported in the parentheses are robust standard errors clustered at the firm level. *, **, *** indicate significance at the two-tailed 10%, 5% and 1% levels, respectively.

	(1)	(2)
Dependent Variable	*Audit Committee Independence*	*Audit Committee Diligence*
PreY1	0.0063	0.0080
	(0.0264)	(0.0337)
Event	0.0355	0.0297
	(0.0278)	(0.0391)
PostY1	0.0757***	0.1322***
	(0.0280)	(0.0309)
PostY2	0.0361	0.0710**
	(0.0263)	(0.0307)
PostY3	-0.0009	0.0258
	(0.0231)	(0.0270)
LN(Assets)	0.0068	0.1145**
	(0.0275)	(0.0445)
Specialist	-0.0338	0.0132
	(0.0271)	(0.0335)
BIG4	0.0341	0.0139
	(0.0299)	(0.0529)
SOX	-0.0030	-0.0802
	(0.0384)	(0.0540)
Financing	0.0004	-0.0464**
	(0.0152)	(0.0184)
Institutional Ownership	0.0997	0.1914*
	(0.0705)	(0.1131)
Board Size	0.1306***	0.0072
	(0.0106)	(0.0099)
Other firm traits	yes	yes
Firm fixed effects	yes	yes
Year fixed effects	yes	yes
N	11290	11308
R-squared	0.1017	0.1825

Table 4. Drivers of Audit Fee Changes

Panel A. Reliance on Financial Covenants

Table 4 Panel A presents the results on how the changes in audit fees following covenant violations vary with the level of reliance on financial covenants prior to violation. The analyses are based on the sample of violating firms. The level of reliance is categorized as *High* if the number of financial covenants is above the median value (two financial covenants) and *Low* otherwise. The dependent variable of each regression model is the natural logarithm of audit fees. *Other firm traits* include *LN(Segment)*, *Foreign*, *ROA*, *Loss*, *InvRec*, *Leverage*, *Market-to-Book*, *Current_Ratio*, *Quick Ratio*, and *SP_Rating*. Variable definitions are in Appendix Table 1. Reported in the parentheses are robust standard errors clustered at the firm level. *, **, *** indicate significance at the two-tailed 10%, 5% and 1% levels, respectively.

	(1)	(2)
Reliance on Financial Covenants	*High*	*Low*
Event	0.0865***	0.0008
	(0.0282)	(0.0238)
LN(Assets)	0.4179***	0.3278***
	(0.0574)	(0.0544)
Fraud Risk	-0.0048	0.0300
	(0.0361)	(0.0301)
BIG4	0.0937*	0.2027***
	(0.0563)	(0.0497)
Specialist	0.0950*	0.0638
	(0.0507)	(0.0443)
Busy	-0.0397	0.1756
	(0.0508)	(0.2134)
Delay	0.1140***	0.1639***
	(0.0431)	(0.0421)
Going Concern	0.1039	0.0768
	(0.1124)	(0.1019)
SOX	0.4068***	0.2956***
	(0.0781)	(0.0804)
Other firm traits	yes	yes
Firm fixed effects	yes	yes
Year fixed effects	yes	yes
N	1421	2031
R-squared	0.6515	0.6582

Table 4 Panel B. Covenant Types

Table 4 Panel B presents the results on how the changes in audit fees following covenant violations vary with the types of covenants (i.e., P-covenant vs. C-covenant) being violated. The analyses are based on the sample of violating firms. The dependent variable of each regression model is the natural logarithm of audit fees. *Other firm traits* include *LN(Segment)*, *Foreign*, *ROA*, *Loss*, *InvRec*, *Leverage*, Market-*to-Book*, *Current_Ratio*, *Quick Ratio*, and *SP_Rating*. Variable definitions are in Appendix Table 1. Reported in the parentheses are robust standard errors clustered at the firm level. *, **, *** indicate significance at the two-tailed 10%, 5% and 1% levels, respectively.

	(1)	(2)
Whether a P-covenant is Violated	*Yes*	*No*
Event	0.0395*	0.0293
	(0.0214)	(0.0243)
LN(Assets)	0.3914***	0.2971***
	(0.0539)	(0.0440)
Fraud Risk	0.0365	-0.0073
	(0.0283)	(0.0270)
BIG4	0.2297***	0.2734***
	(0.0523)	(0.0549)
Specialist	-0.0610	-0.0350
	(0.0561)	(0.0521)
Busy	-0.1840	0.1736
	(0.2235)	(0.1586)
Delay	0.0663**	0.0534
	(0.0331)	(0.0377)
Going Concern	0.0852	0.0303
	(0.0669)	(0.0686)
SOX	0.5016***	0.3981***
	(0.0620)	(0.0757)
Other firm traits	yes	yes
Firm fixed effects	yes	yes
Year fixed effects	yes	yes
N	2012	1383
R-squared	0.5695	0.6142

Table 4 Panel C. Waiver Decision

Table 4 Panel C presents the results on how the changes in audit fees following covenant violations vary with whether a waiver is granted during the violation year. The analyses are based on the sample of violating firms. The dependent variable of each regression model is the natural logarithm of audit fees. *Other firm traits* include *LN(Segment)*, *Foreign*, *ROA*, *Loss*, *InvRec*, *Leverage*, *Market-to-Book*, *Current_Ratio*, *Quick Ratio*, and *SP_Rating*. Variable definitions are in Appendix Table 1. Reported in the parentheses are robust standard errors clustered at the firm level. *, **, *** indicate significance at the two-tailed 10%, 5% and 1% levels, respectively.

	(1)	(2)
If Receive a Waiver	*No*	*Yes*
Event	0.0493**	0.0316**
	(0.0206)	(0.0148)
LN(Assets)	0.3279***	0.3525***
	(0.0415)	(0.0276)
Fraud Risk	0.0061	0.0017
	(0.0248)	(0.0167)
BIG4	0.2601***	0.1860***
	(0.0523)	(0.0318)
Specialist	0.0212	0.0176
	(0.0433)	(0.0305)
Busy	0.3726*	0.0315
	(0.1995)	(0.0912)
Delay	0.1042***	0.1130***
	(0.0347)	(0.0209)
Going Concern	0.1186**	0.0296
	(0.0558)	(0.0420)
SOX	0.4358***	0.4664***
	(0.0553)	(0.0393)
Other firm traits	yes	yes
Firm fixed effects	yes	yes
Year fixed effects	yes	yes
N	2757	5383
R-squared	0.5264	0.5848

Table 5. Implications of Audit Fee Responses

Panel A. Borrowing Costs

Table 5 Panel A presents results on how audit fee responses to covenant violations moderate the changes in borrowing costs post violation. The analyses are based on the sample of violating firms. The dependent variable *LN(Loan Spread)* is the natural logarithm of All-in-Drawn-Spread (interest rate over LIBOR) reported in DealScan. Variable definitions are in Appendix Table 1. Reported in the parentheses are robust standard errors clustered at the firm level. *, **, *** indicate significance at the two-tailed 10%, 5% and 1% levels, respectively.

	(1)	(2)
Dependent Variable	**LN(Loan Spread)**	**LN(Loan Spread)**
Whether Audit Fees Increase Post Violation	*Yes*	*No*
Post-Violation	0.0485*	0.1118**
	(0.0289)	(0.0474)
Loan Size	-0.0982***	-0.0565
	(0.0205)	(0.0395)
Term Loan	0.0123	0.0353
	(0.0690)	(0.1039)
Loan Maturity	-0.0189	0.0053
	(0.0333)	(0.0538)
Number of Lenders	-0.0026	-0.0106
	(0.0033)	(0.0081)
Performance Pricing	-0.1716***	-0.0968
	(0.0366)	(0.0661)
Collateral	0.3536***	0.3626***
	(0.0414)	(0.0721)
Ln(Assets)	-0.0627***	-0.0880*
	(0.0234)	(0.0502)
Market-to-Book	-0.0138**	-0.0171
	(0.0070)	(0.0196)
Leverage	0.6938***	0.7495***
	(0.0971)	(0.1971)
ROA	-0.0234	-0.0750
	(0.1510)	(0.2622)
CF Volatility	-0.2028***	-0.0266
	(0.0369)	(0.1131)
Tangibility	0.0143	-0.2718*
	(0.0893)	(0.1495)
Z Score	-0.1429***	-0.1417***
	(0.0272)	(0.0458)
Year fixed effects	yes	yes
N	956	342
R-squared	0.3681	0.4142

Table 5 Panel B. Investment Conservatism

Table 5 Panel B presents results on how audit fee responses to covenant violations moderate changes in capital expenditures (columns 1–2) and cash acquisitions (columns 3–4) post violation. The analyses are based on the sample of violating firms. Variable definitions are in Appendix Table 1. Reported in the parentheses are robust standard errors clustered at the firm level. *, **, *** indicate significance at the two-tailed 10%, 5% and 1% levels, respectively.

	(1)	(2)	(3)	(4)
Dependent Variable	**ΔCAPX/Avg Assets**		**ΔLn(Acquisitions)/Avg Asset**	
Whether Audit Fees Increase Post Violation	*Yes*	*No*	*Yes*	*No*
Event	-0.0026	-0.0071	0.0042	0.0009
	(0.0041)	(0.0055)	(0.0059)	(0.0118)
PostY1	-0.0080***	-0.0103	-0.0190***	0.0153
	(0.0028)	(0.0072)	(0.0045)	(0.0097)
LN(Assets)	-0.0109	-0.0028	0.0242***	-0.0068
	(0.0086)	(0.0037)	(0.0063)	(0.0165)
PPE/Assets	-0.0231	0.0017	-0.0204	-0.0783**
	(0.0268)	(0.0106)	(0.0130)	(0.0318)
CFO	-0.0035	0.0015	0.0009	0.1195
	(0.0062)	(0.0087)	(0.0016)	(0.1085)
Leverage	-0.0291**	-0.0037	0.0204*	0.0164
	(0.0147)	(0.0149)	(0.0112)	(0.0204)
IntExp	0.1205	0.0171	-0.0280	0.2006
	(0.1283)	(0.0212)	(0.0265)	(0.2491)
NW	0.0008	0.0001	-0.0004***	-0.0001
	(0.0006)	(0.0001)	(0.0001)	(0.0003)
Current Ratio	-0.0112	-0.0116	-0.0667***	-0.0620
	(0.0170)	(0.0229)	(0.0210)	(0.0562)
Market-to-Book	0.0012	-0.0007	0.0008**	0.0014
	(0.0007)	(0.0004)	(0.0004)	(0.0011)
Firm fixed effects	yes	yes	yes	yes
Year fixed effects	yes	yes	yes	yes
N	5944	1515	5992	1524
R-squared	0.1092	0.2019	0.1139	0.1418

Table 6. Litigation Risk and Audit Fee Responses

Table 6 presents results on how the audit fee responses to covenant violations vary with litigation risk characterized by negative cumulative abnormal return (CAR) surrounding violation date. A *negative CAR firm* is defined as an indicator equal to one if the firm ever experiences negative CAR during the seven-day violation period and zero otherwise. The dependent variable of each regression model is the natural logarithm of audit fees. *Other firm traits* include *LN(Segment)*, *Foreign*, *ROA*, *Loss*, *InvRec*, *Leverage*, *Market-to-Book*, *Current_Ratio*, *Quick Ratio*, and *SP_Rating*. Variable definitions are in Appendix Table 1. Reported in the parentheses are robust standard errors clustered at the firm level. *, **, *** indicate significance at the two-tailed 10%, 5% and 1% levels, respectively.

	(1)	(2)	(3)	(4)
Whether a Negative CAR Firm	*Yes*	*No*	*Yes*	*No*
Event	0.0378***	0.0484***	0.0691***	0.0856***
	(0.0144)	(0.0170)	(0.0183)	(0.0212)
PostY1			0.0764***	0.1079***
			(0.0216)	(0.0254)
PostY2			0.0698***	0.0595**
			(0.0220)	(0.0259)
PostY3			0.0481**	0.0134
			(0.0201)	(0.0233)
LN(Assets)	0.3503***	0.3351***	0.3461***	0.3288***
	(0.0279)	(0.0351)	(0.0279)	(0.0347)
Fraud Risk	-0.0209	0.0328	-0.0192	0.0358*
	(0.0165)	(0.0202)	(0.0165)	(0.0203)
BIG4	0.1969***	0.1941***	0.1972***	0.1940***
	(0.0342)	(0.0382)	(0.0339)	(0.0379)
Specialist	0.0243	0.0235	0.0167	0.0187
	(0.0328)	(0.0353)	(0.0324)	(0.0353)
Busy	0.1287	0.1346	0.1194	0.1348
	(0.1253)	(0.1388)	(0.1244)	(0.1380)
Delay	0.0969***	0.1300***	0.0948***	0.1252***
	(0.0211)	(0.0283)	(0.0209)	(0.0280)
Going Concern	0.0405	0.1049**	0.0391	0.0920*
	(0.0402)	(0.0501)	(0.0401)	(0.0491)
SOX	0.4849***	0.3701***	0.4834***	0.3718***
	(0.0397)	(0.0484)	(0.0395)	(0.0480)
Other firm traits	yes	yes	yes	yes
Firm fixed effects	yes	yes	yes	yes
Year fixed effects	yes	yes	yes	yes
N	5223	3844	5223	3844
R-squared	0.5178	0.6048	0.5212	0.6089

Table 7. Engagement of Big 4 Auditors

Table 7 presents results on how covenant violation influence engagement with Big 4 auditors based on the sample of violating firms. The dependent variable *Engage_BIG4* is an indicator variable coded as one if the firm switches from a non-Big4 auditor to a Big4 auditor during the fiscal year and zero otherwise. *No Waiver* is an indicator variable coded as one if a firm does not receive a waiver during the violation year and zero otherwise. The marginal effects (dy/dx) of the probit regressions are presented. The marginal effect of a dummy variable is calculated as the discrete change in the expected value of the dependent variable as the dummy variable changes from 0 to 1. Variable definitions are in Appendix Table 1. Reported in the parentheses are robust standard errors clustered at the firm level. *, **, *** indicate significance at the two-tailed 10%, 5% and 1% levels, respectively.

	(1)	(2)
Dependent Variable	*Engage_BIG4*	*Engage_BIG4*
PreY1	0.0040	0.0039
	(0.0038)	(0.0038)
Event	0.0004	0.0004
	(0.0034)	(0.0040)
PostY1	0.0072**	0.0062*
	(0.0032)	(0.0035)
Event * No Waiver		-0.0022
		(0.0054)
PostY1 * No Waiver		0.0632*
		(0.0361)
LN(Assets)	0.0004	0.0004
	(0.0010)	(0.0010)
Loss	0.0030	0.0032
	(0.0030)	(0.0030)
Leverage	0.0001	0.0002
	(0.0039)	(0.0039)
Market-to-Book	-0.0006**	-0.00006**
	(0.0003)	(0.0003)
ROA	0.0051	0.0049
	(0.0069)	(0.0068)
Specialist	0.0065*	0.0066*
	(0.0038)	(0.0038)
SOX	-0.0344***	-0.0343***
	(0.0027)	(0.0027)
Financing	-0.0106***	-0.0105***
	(0.0028)	(0.00028)
Institutional Ownership	0.0130**	0.0131**
	(0.0057)	(0.0057)
Board Size	0.0013	0.0013
	(0.0009)	(0.0009)
Outsiders	0.0119	0.0118
	(0.0133)	(0.0132)
Year fixed effects	yes	yes
N	7290	7290
R-squared	0.0832	0.0845

Appendix Table 1. Variable Definitions

Variable	Definition
Event	Dummy variable that takes the value of 1 if the firm reports a new covenant violation in the current year and 0 otherwise.
PostY1	Dummy variable that takes the value of 1 if the firm reports a new covenant violation in the immediately preceding year and 0 otherwise.
PostY2	Dummy variable that takes the value of 1 if the firm reports a new covenant violation two years before the current year and 0 otherwise.
PostY3	Dummy variable that takes the value of 1 if the firm reports a new covenant violation three years before the current year and 0 otherwise.
LN(Audit Fee)	The natural logarithm of audit fees (in thousand $).
LN(Assets)	The natural logarithm of total assets (in million $).
SOX	Dummy variable which takes the value of 1 if the firm is an accelerated filer (filer status reported in Audit Analytics) and the year is 2004 or later and 0 otherwise.
BIG4	Dummy variable that takes the value of 1 if the firm's auditor is a Big 4 firm and 0 otherwise.
Fraud Risk	Accounting fraud indictor variable calculated according to Doogar et al. (2010). Fraud Risk equals 1 if auditee fraud risk *F*-score is higher than 1 and 0 otherwise. *F*-score is computed as ePV /[0.00345(1 + ePV)], where PV = – 6.789 + 0.817 *Rsst acc* + 3.230 ΔRec + 2.436 ΔInv + 0.122ΔCS – 0.992 $\Delta Earn$ + 0.972 *Issue.* Here, *Rsst acc* = [($WC_t - WC_{t-1}$) + ($NCO_t - NCO_{t-1}$) + ($FIN_t - FIN_{t-1}$)] ÷ [0.5($AT_t + AT_{t-1}$)], where *WC* = [Current Assets – Cash and Short-Term Investments] – [Current Liabilities – Short-Term Debt], *NCO* = [Total Assets – Current Assets – Long-Term Investments] – [Total Liabilities – Current Liabilities – Long-Term Debt], and *FIN* = [Short-Term Investments + Long-Term Investments] – [Long-Term Debt + Short-Term Debt + Preferred Stock]. ΔRec = [$Rec_t - Rec_{t-1}$] ÷ [0.5($AT_t + AT_{t-1}$)], where *Rec* is total receivables and *AT* is total assets. ΔInv = [$Inv_t - Inv_{t-1}$] ÷ [0.5($AT_t + AT_{t-1}$)], where *Inv* is total inventory and *AT* is total assets. ΔCS = ($CS_t - CS_{t-1}/CS_{t-1}$) ∗ 100 where *CS* is sales less change in accounts receivable. $\Delta Earn$ = [$Earn_t \div AT_t$] – [$Earn_{t-1} \div AT_{t-1}$], where *Earn* is earnings and *AT* is total assets. *Issue* = 1 if firm issued securities during the year and 0 otherwise.
LN(Segment)	The natural logarithm of the number of segments (see Doogar et al. 2010).
Foreign	Dummy variable that takes the value of 1 if the auditor reports foreign currency transaction and 0 otherwise.
ROA	Net income/total assets.
Loss	Dummy variable that takes the value of 1 if net income is negative and 0 otherwise.
InvRec	Sum of inventories and accounts receivables divided by total assets.
Leverage	Total liabilities/total assets.
Busy	Dummy variable that takes the value of 1 if fiscal year ends in January or December and 0 otherwise.
Delay	Dummy variable that takes the value of 1 if number of days delayed is greater than statutory filing period and 0 otherwise.
Going Concern	Dummy variable that takes the value of 1 if auditor issues a going-concern opinion and 0 otherwise.

Appendix Table 1. Variable Definitions (Cont'd)

Variable	Definition
Market-to-Book	Market value of equity/book value of equity.
Current Ratio	Current assets/total assets.
Quick Ratio	(Current assets – inventory)/current liabilities.
Specialist	Dummy variable which takes the value of 1 if the audit firm receives the highest audit fee revenue from the corresponding two-digit SIC code during the year and 0 otherwise.
SP_Rating	SP rating long-term dummy, ranging from 1 through to 21 corresponding to the lowest quality S&P rating to the highest quality S&P rating; a value of 0 is assigned to nonrated firms.
Audit Committee Independence	Measured as the number of independent directors in the audit committee.
Audit Committee Diligence	Measured as the number of audit committee meetings during the year.
Institutional Ownership	Percentage of shares held by institutional shareholders.
LN(Loan Spread)	The natural logarithm of all-in-drawn-spread (basis points over LIBOR), reported by DealScan.
Loan Size	The natural logarithm of the amount of the loan in millions of dollars.
Term Loan	An indicator variable equal to 1 if the loan is a term loan and 0 otherwise.
Loan Maturity	The natural logarithm of the number of months between the facility's issue date and the loan maturity date.
Number of Lenders	Number of participants in the loan syndicate.
Performance Pricing	An indicator variable equal to 1 if the loan contract includes a performance pricing provision and 0 otherwise.
Collateral	An indicator variable equal to 1 if the loan is backed by collateral and 0 otherwise.
CF Volatility	Standard deviation of quarterly cash flows from operations over previous four fiscal years, scaled by total assets.
Tangibility	Net PPE divided by total assets.
Z Score	Modified Altman (1968) Z-score = (1.2 × working capital + 1.4 × retained earnings + 3.3 × EBIT + 0.999 × sales)/total assets. The ratio of market value of equity to book value of total debt is omitted from the calculation because market-to-book enters the regressions as a separate variable.
Outsiders	Percentage of outside directors on the audit committee
Financing	An indicator variable that equal to1 if the number of common shares outstanding or the long-term debt increased by at least 10 percent and 0 otherwise.
Board Size	Number of directors on the board.
Waiver	An indicator variable that takes the value of 1 if a firm has been granted a waiver upon covenant violation and 0 otherwise.
Performance Covenant	An indicator variable that takes the value of 1 if a firm violated at least one of the following performance covenants—interest coverage ratio, fixed charge coverage ratio, debt service coverage ratio, cash flow coverage ratio, debt to EBITDA, senior debt to EBITDA, or EBITDA—and 0 otherwise.

Appendix Table 1. Variable Definitions (Cont'd)

Variable	Definition
CFO	Operating cash flows deflated by average total assets.
IntExp	Interest expense scaled by average assets.
NW	Stockholders' total equity deflated by total assets at the beginning year.
PPE	Property, plant, and equipment.
CAPX/Avg Assets	Capital expenditures scaled by average total assets.
Acquisition/Avg Assets	Cash acquisitions scaled by average total assets.
Negative CAR firm	An indicator equal to 1 if a firm ever experiences negative cumulative abnormal return (CAR) during the seven-day violation period centered on the violation announcement date and 0 otherwise.
Engage_BIG4	An indicator variable that takes the value of 1 if a firm has changed auditor from a Non-Big 4 to a Big 4 auditor upon covenant violation and 0 otherwise.

Appendix Table 2. Propensity-Score Matching

This table reports the results from the propensity matching analysis designed to identify the effect of covenant violations on audit fees. The propensity scores are estimated by a probit model. The dependent variable for the probit model is a dummy variable that equals 1 if the firm reported a new covenant violation in the current year and 0 otherwise. Panel A reports results based on the matching algorithm that includes audit fee control variables. Panel B reports results based on the matching algorithm that includes the audit fee control variables and audit fees in the past two years. Panel C reports descriptive statistics of firm characteristics of the violating and nonviolating firms.

Matching estimators are nearest neighbor matching using n loans without covenant violations (where n=10 in our analysis), radius matching, and bootstrap matching (with 100 replications), respectively. Column 2 in Panels A and B provides the sample averages of the audit fee differences between covenant violation firms and nonviolation firms. ***, **, * indicate significantly different than zero at the 1%, 5%, and 10% levels, respectively.

Panel A. The following probit model is used to estimate the propensity score:

$Vio\_Event_{it} = LN(Assets)_{it} + LN(Segment_{it} + Foreign_{it} + ROA_{it} + Loss_{it} + InvRec_{it} + Leverage_{it} + Market\text{-}to\text{-}Book_{it} + Current\ Ratio_{it} + Quick\ Ratio_{it} + SP\ Rating_{it} + Fraud\ Risk_{it} + BIG4_{it} + Specialist_{it} + Busy_{it} + Delay_{it} + Going\ Concern_{it} + SOX_{it} + e_i.$

(1)	(2)	(3)
Matching method	*LN(Audit Fee)* Difference Between Treatment and Control Group	p-value
Nearest neighbor	0.07	0.029**
Radius matching	0.069	0.025**
Bootstrap matching	0.085	0.051*

Panel B. The following probit model is used to estimate the propensity score:

$Vio\_Event_{it} = LN(Audit\ Fee)_{i,t-1} + LN(Audit\ Fee)_{i,t-2} + LN(Assets)_{it} + LN(Segment_{it} + Foreign_{it} + ROA_{it} + Loss_{it} + InvRec_{it} + Leverage_{it} + Market\text{-}to\text{-}Book_{it} + Current\ Ratio_{it} + Quick\ Ratio_{it} + SP\ Rating_{it} + Fraud\ Risk_{it} + BIG4_{it} + Specialist_{it} + Busy_{it} + Delay_{it} + Going\ Concern_{it} + SOX_{it} + e_i.$

(1)	(2)	(3)
Matching method	*LN(Audit Fee)* Difference Between Treatment and Control Group	p-value
Nearest neighbor	0.088	0.036**
Radius matching	0.094	0.019**
Bootstrap matching	0.110	0.055*

Appendix Table 3. Abnormal Audit Fees

This table presents the results on the abnormal audit fees following covenant violations to identify the incremental effect of covenant violations on audit fees. For each two-digit SIC industry, we estimate the industry-specific "normal" audit fees by fitting the regression of audit fees in the pre-violation period on the control variables. We then apply the estimated parameters to calculate the normal audit fees during the post-violation years. The difference between the observed audit fees (Column 4) and the estimated normal audit fees (Column 3) represents industry-adjusted abnormal audit fees. We conduct t tests to examine whether the abnormal audit fees are significantly different from zero and report the results in Column 5.

(1) Post-Violation Period	(2) # of Observations	(3) Mean of the Predicted LN(Audit Fee)	(4) Mean of LN(Audit Fee)	(5) T-Test (t-value): Null: Abnormal Audit Fee = 0
0	1882	5.5928	5.6613	4.8297***
1	1871	5.5418	5.6370	7.3773***
2	1881	5.4883	5.5943	7.3379***
3	1753	5.4998	5.6078	7.5757***
Conclusion: null hypotheses are rejected.				