Does Accounting Quality Mitigate Risk Shifting?

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Abstract

This study examines the effect of financial reporting quality on risk shifting, an investment distortion that is caused by shareholders' incentives to engage in high-risk projects that are detrimental to debtholders. I use asymmetric timeliness to proxy for a dimension of accounting quality that is particularly useful to debtholders. Asymmetric timeliness is expected to improve debtholders' ability to effectively monitor the management's actions and to discipline the managers when necessary. I predict that the effect of accounting quality on risk shifting will be stronger in firms with poor information environment, in distressed firms, in cash-rich firm, and after the adoption of the Sarbanes-Oxley Act of 2002. I also expect this effect to vary based on the firm's source of debt. The results are consistent with the predictions and robust to alternative measures of risk shifting, accounting quality, distress risk, and various control variables.

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1. Introduction

Risk shifting, also referred to as asset substitution in the finance literature, is an investment distortion that benefits shareholders to the detriment of creditors. This study provides empirical support for the hypothesis that high quality financial accounting information reduces risk shifting by limiting the ability of managers to engage in suboptimally risky behavior. Assuming that debtholders can foresee the management's actions, they will price protect themselves by incorporating the expected losses from risk shifting (including the monitoring and disciplining costs) into the price of debt *ex ante*. Since shareholders will ultimately bear the costs of risk shifting, they will benefit from using a mechanism that can lower these costs (Myers, 1977). I argue that pre-commitment to high accounting quality serves as a bonding mechanism that allows shareholders to lower the agency cost of debt and to decrease the deadweight loss.

Risk shifting was first introduced to the finance literature by Jensen and Meckling (1976) and Galai and Masulis (1976) as a conflict of interests between shareholders and debtholders. It involves managers, assumed to be acting in the interests of shareholders, switching to riskier projects even though these projects may have a negative NPV for the firm. Such a shift in the investment policy increases the value of the firm's equity, but decreases the value of debt. In effect, risk shifting leads to a wealth transfer from debtholders to equityholders, which is possible because the risk of investments is not shared equally between the two parties. Shareholders capture most of the upside, while debtholders bear most of the downside due to the asymmetric nature of their claims.[1]

[1] Jensen and Meckling (1976) provide an analogy to risk shifting by comparing it to "the way one would play poker on money borrowed at a fixed interest rate, with one's own liability limited to some very small stake."

Debtholders have an asymmetric payoff function that is capped at face value of debt, but can go down to zero. Shareholders, on the other hand, have an unlimited upside potential but cannot lose more than they have invested in the company due to the limited liability doctrine. This asymmetry makes lenders more sensitive to increases than to decreases in default risk. This idea can be best understood by treating shareholders' equity as a call option on the firm's assets (Merton, 1974). The effect of a change in volatility of the underlying asset (i.e., firm's assets) on the option value (i.e., the value of equity) increases as the value of the underlying asset decreases relative to the strike price of the option (the firm's debt). That is, as the price of equity falls lower and lower relative to the value of debt (i.e., as the firm becomes more and more distressed), the potential gain to shareholders from shifting to higher-variance projects increases.

Consistent with this idea, a number of papers argue that the severity of risk shifting is expected to be higher in firms with either high leverage (e.g., Jensen and Meckling, 1976; Smith and Warner, 1979; Green and Talmor, 1986) or distress risk (e.g., Brealey, Myers, and Allen, 2006; Eisdorfer, 2008; Easton et al., 2009). However, there is also evidence that when a firm becomes distressed, risk shifting may be offset by other incentives, such as risk management (e.g., Guay, 1999; Purnanandam, 2008; Rauh, 2009), corporate tax minimization (Green and Talmor, 1985), or by higher benefits from under-investment (Mao, 2003). In the end, it is an empirical question whether the net benefit of risk shifting is higher in distressed firms.

I argue that high accounting quality as proxied for by asymmetric timeliness can help mitigate risk shifting by improving debtholders' ability to effectively monitor the management's actions and to discipline the managers when needed. Asymmetric timeliness is "the accountant's tendency to require a higher degree of verification to recognize good news as gains than to recognize bad news as losses" (Basu, 1997, p. 7). First, firms with high asymmetric timeliness recognize bad news faster in financial reports, which gives debtholders more time to address te issue. Second, asymmetric timeliness is expected to enhance the effectiveness of accounting-based contractual restrictions on the managers' decision rights.

Asymmetric timeliness brings bad news forward and exerts a downward pressure on both earnings and net assets thus making covenant violations more likely (Zhang, 2008). Early recognition of bad news relative to good news sends a timely signal of distress to debtholders and allows them more time for remedial actions. Besides, the incidence of a covenant breach gives debtholders control rights necessary to take remedial actions, such are recalling the debt, raising interest rates, or adding more covenants to existing contracts. In other words, violation of a debt covenant provides creditors with a legally enforceable option to review and renegotiate the debt contract, which improves debtholders' ability to monitor managers' actions efficiently and to intervene quickly whenever warranted. An increase in accounting quality along this dimension thus decreases the managers' ability to engage in risky investment behavior.

If accounting quality indeed plays a role in mitigating risk shifting, I expect it to dampen the increase in business risk following new investments made by distressed firms. I proxy for the change in the firm's level of risk using one-period-ahead changes in volatility of the firm's asset values. I predict that investment corresponds to a lower increase in asset value volatility when accounting quality is higher. I measure the degree of asymmetric timeliness in financial reports (*AsymTime*) using a firm-specific measure of conditional conservatism (*C_Score*) developed by Khan and Watts (2009).

Several contractual mechanisms have been argued to reduce risk shifting. Convertible debt allows debtholders to share in the upside potential, thus limiting shareholders' gains from risk shifting (e.g., Jensen and Meckling, 1976; Green, 1984). Secured debt can limit risk shifting since secured debtholders hold title to the collateral, making it impossible to sell the assets without debtholders' approval (e.g., Smith and Warner, 1979). Issuing short-term debt can be another solution, since having the debt mature before an investment is undertaken eliminates the incentives for shareholders to engage in risk shifting (Myers, 1977; Barclay and Smith, 1995). Eisdorfer (2008) provides empirical evidence that risk shifting still exists in distressed firms despite the presence of these three contractual mechanisms.

Including restrictive covenants in debt contracts is another important commitment device that can be used to reduce risk shifting (Smith and Warner, 1979). While shareholders prefer not to have covenants restricting firm's investment choices *ex post*, they accept these covenants *ex ante* to rule out future actions that may increase shareholders' value in the short run (e.g., risk shifting) but that will eventually lead to a deadweight loss to the firm (Myers, 1977). I control for the presence of the mechanisms described above using the data on public and syndicated debt issues available from the Fixed Investment Securities Database (FISD) and the Securities Data Corporation (SDC).

I also test a number of cross-sectional and time-series predictions. I expect the usefulness of accounting information for lenders to vary cross-sectionally with the richness of the firm's information environment, the level of distress risk, the availability of cash, and the source of debt (public versus syndicated). I also expect time-series variation based on whether observations belong to the time periods before or after the adoption of the Sarbanes-Oxley Act of 2002 (SOX). I proxy for the richness of information environment using the average daily bid-ask spread, the number of analysts following the firm, and the adjusted PIN score (from Duarte and Young, 2009). I use changes in implied asset volatility from the Merton (1974) model as a proxy for changes in business risk. I use cash flow from operations to proxy for the strength of risk shifting incentives due to the ease with which cash can be converted into riskier assets.

I combine several databases to obtain a sample containing contract-specific information on outstanding public and private debt with financial and accounting data (the Debt Covenant Sample). The final sample includes 11,238 firm-year observations and 2,344 individual firms between 1995 and 2006 and is collected by intersecting publicly available financial information from Compustat and CRSP with data on public debt issues and syndicated loans. I gather data on public debt issues from the Mergent Fixed Investment Securities Database (FISD) and data on syndicated loan deals from the Securities Data Corporation (SDC) database.

The results support the hypothesis that accounting quality reduces risk shifting. The sensitivity of volatility changes to new investments decreases by a half when a firm moves from the lowest accounting quality decile to the highest accounting quality decile. I control for the presence of the contractual mechanisms that have been argued to reduce risk shifting (i.e., short-term debt, convertibility, secured debt, and restrictions on asset sales and capital expenditures). The effect of accounting quality on risk shifting also appears to be stronger in firms with poor information environment and in firms with public debt. I also find that the effect of accounting quality on risk shifting (as well as the risk shifting behavior itself) is present only in the two top distress quintiles.

The results are robust to alternative proxies for firm riskiness, investment intensity, the level of distress risk, and alternative financing arrangements (leases). I also control for firm- and market-specific characteristics that have been shown to affect future volatility, investment, and accounting quality. The results are consistent with the prediction that firms with high accounting quality exhibits fewer signs of risk shifting.

This study contributes to the understanding of the effects of accounting information on business decisions. I explore a specific debt-equity agency conflict, risk shifting, and show that accounting quality can improve investment efficiency by preventing firms from engaging in suboptimally risky activities and thus can reduce deadweight losses. A number of recent papers examine whether various accounting quality dimensions can mitigate agency conflicts (e.g., LaFond and Watts, 2008; Zhang, 2008, Louis et al., 2009) and improve investment efficiency (e.g., Biddle and Hilary, 2006; Biddle et al., 2008; Francis and Martin, 2008). The results in this study are consistent with and complement this line of research.

While many papers concentrate on the effects of accounting quality on the profitability of investments (the first moment of the return distribution), I focus on the effect of accounting quality on the riskiness of investments (the second moment of the return distribution). Most of modern finance theory depends on the assumption that the mean and the variance are the only two properties of the return distribution that investors use to solve their portfolio optimization problem. Thus, changes in the level of risk have value implications for investors. This study shows that accounting quality can prevent firms from making suboptimally risky investments and incurring deadweight losses by enhancing the monitoring and disciplining mechanisms available to debtholders.

The rest of the study is organized as follows. Section 2 provides some background on risk shifting and motivates the role accounting quality plays in mitigating this investment distortion. Section 3 explains model specifications, and the measures of accounting quality and distress risk. Section 4 presents the sample selection procedure and descriptive statistics. Section 5 discusses the empirical results while Section 6 describes the robustness tests. Section 7 offers potential extensions and concludes.

2. Hypothesis Development

2.1. Incentives and consequences of risk shifting

Risk shifting occurs when managers substitute away from lower risk assets or strategies toward riskier ones. In effect, risk shifting involves a wealth transfer from debtholders to shareholders as a result of risky investment decisions.[2] This transfer is possible because the upside and the downside potentials of risky investment are not shared equally among shareholders and debtholders. Shareholders capture most of the upside of high-risk activities while debtholders absorb most of the downside.[3] At maturity, lenders receive at most the face value of debt.[4] The payoff, however, may be less than the face value if the value of the firm's assets is insufficient to cover the principal. Due to limited liability, debtholders cannot recover anything from shareholders beyond the value of the assets. In contrast, shareholders may also lose up to one hundred percent of their investment, but their payoff is not bounded from above.

Debt-equity agency conflicts arise only when a firm has risky debt. When the possibility of default is virtually zero, "debtholders have no interest in income, value or risk of the firm" (Myers, 2001, p. 96). Debt payoff function is flat in this region and small changes in the firm's economic outlook do not affect the value of debt. However, when there is a possibility that the

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[2] Risk shifting is usually caused by managers over-investing in risky projects. On certain occasions, however, risk shifting can result from under-investing. In case of an airline, for instance, under-investing in such projects as required repairs and maintenance can make airplanes less reliable and cause the operations to become more risky thus subjecting the company to a higher probability of accidents and lawsuits. Not purchasing enough insurance may have a similar risk-increasing effect.

[3] This may not always be the case, even for investors holding plain vanilla bonds. The fast growth of credit derivatives has created the so-called "empty creditor" problem (Hu, 2009). Credit default swaps allow lenders to decrease or even eliminate the default risk associated with their debt investment. In fact, a lender may have a short exposure to the borrower's credit quality if the former holds more credit default swaps than debt claims on the borrower's assets. Since the lender will benefit if the borrower defaults on its obligations, the former may be incentivized to push the latter toward default even though such an outcome would be undesirable for both parties in the absence of credit default swaps.

[4] Whereas the payoff at maturity is typically fixed at face value, the value of debt may be higher than the face value at some point prior to maturity. For instance, a steep decrease in interest rates may cause certain coupon bonds to sell above par. In addition, interest-decreasing performance pricing provisions commonly used in bank debt as documented by Asquith et al. (2005) often allow for the reduction of the rate of interest of debt if the borrower's credit quality has improved. This may also make the value of bank debt higher than the final maturity payoff.

debt will not be repaid in full at maturity, shareholders can gain at the expense of debtholders. Being rational, debtholders take into account the shareholders' incentives to engage in risk shifting after entering into the debt contract and price protect themselves. Since they are the residual claimants, shareholders bear the cost of risk shifting by paying a higher interest rate on debt to compensate debtholders for the expected losses due to suboptimal investment behavior as well as for the costs debtholders expect to incur for additional monitoring and disciplining.

Black and Scholes (1973) and Merton (1974) pioneered the view of the firm's capital structure using an option-pricing framework. The payoff structure of debt, for example, can be replicated by taking a long position in the firm's assets and a short position in a call option on these assets with the strike price that equals the face value of debt and the maturity that equals the maturity of debt (assuming, for simplicity, that it is a zero-coupon debt). Under the law of one price, debt value should equal the value of assets less the value of the call. Viewing capital structure within the option-like framework makes it clear that increasing the volatility of assets, *ceteris paribus*, will cause the value of equity to increase and the value of debt to decrease.[5]

Appendix 1, Panel A presents a hypothetical example of how increasing asset volatility benefits equityholders to the detriment of debtholders. The example also demonstrates that the same (or proportional) increase in asset volatility produces more benefits for shareholders of a more risky firm. Appendix 1, Panel B illustrates a similar idea in a continuous-time setting using the empirical data from the sample used in this study. Two pairs of firms are compared: the two "mean firms" possess the mean characteristics of the main sample used in this study (the Debt

[5] A caveat regarding the use of option-pricing models to examine the firm behavior is warranted. Jensen and Meckling (1976) and Smith and Warner (1979) note that the option pricing analysis assumes that the value of the firm (debt and equity) is independent of its capital structure, which may not be the case if debt covenants are present. The option pricing analysis also ignores endogeneity in stockholders behavior by treating the incidence of default, as well as the value and the volatility of the firm's assets as exogenous rather than as decision variables.

Covenant Sample) and of the top distress quintile of this sample while the two "median firms" have the median characteristics of the two above-mentioned samples.

As stated in Appendix 1, the total change in the value of the call option (i.e., the market value of equity) for a small change in volatility (of assets) is maximized at a point where the value of the call option equals the strike price (i.e., the face value of debt). Similarly, the percentage change in the value of the call for a small percentage change in volatility is maximized when the value of the call is small relative to the value of the strike price. Thus, the value transfer from debtholders to equityholders resulting from risk shifting is highest when the value of assets is close to the face value of debt or is far below it, depending on which option sensitivity measure is used. Regardless of the measure used, both maxima lie in the region when the probability of the firm defaulting on its obligations is relatively high.

Consistent with this idea, a large stream of literature in finance examines risk shifting as an important cost of financial distress that is relevant to firms with risky debt. All else equal, the severity of risk shifting is expected to be higher in firms with more risky debt. Two proxies for the strength of risk shifting incentives are typically used: a) high leverage (e.g., Jensen and Meckling, 1976; Smith and Warner, 1979; Green and Talmor, 1986); and b) high default risk (e.g., Brealey, Myers, and Allen, 2006; Eisdorfer, 2008; Easton et al., 2009).

At the same time, a number of papers argue that risk shifting does not monotonically increase in leverage (e.g., Gavish and Kalay, 1983; Bhanot and Mello, 2006) or that it is offset by other incentives prevalent in distressed firms such as risk management (e.g., Guay, 1999; Purnanandam, 2008; Rauh, 2009) and corporate tax minimization (Green and Talmor, 1985), or by higher benefits from under-investment (Mao, 2003). In fact, some researchers argue that risk shifting effects may be small or insignificant (e.g., Andrade and Kaplan, 1998; Parino and

Weisbach, 1999). Besides, debtholders in distressed firms are more likely to have stronger control rights than their counterparts in financially healthy firms (e.g., Nini et al., 2009-b) and thus can exert more pressure on the firm to abstain from suboptimal investment decisions. Thus, it is an empirical question whether the net benefit of risk shifting is higher in distressed firms.

Empirical evidence is consistent with the presence of risk shifting in financial firms. Brown et al. (1996) and Brown et al. (2001) find that mutual and hedge fund managers, respectively, take more risk in the second half of the year if their portfolio experienced sub-standard performance in the first half of the year. Evidence on risk shifting in non-financial firms is sparse, possibly due to the fact that the market value of assets is not directly observable, which makes estimating asset volatility difficult. Recent research shows that the effect of risk shifting on the value of debt is non-trivial. Eisdorfer (2008) examines the relation between volatility and investment in distressed firms and finds that the value of debt may be reduced by as much as 6 percent as a result of risk-shifting behavior in high-volatility periods. He measures asset volatility of non-financial firms by using the Merton (1974)-inspired option-based framework (described in Appendix 3) and infers asset value and volatility from the value and volatility of equity.

2.2. Mechanisms that reduce risk shifting

Rational debtholders recognize managers' incentives and incorporate value implications of managers' future actions into the price of debt. On average, debtholders will not suffer losses from suboptimal corporate decisions unless they consistently underestimate the effects of such decisions (Jensen and Smith, 1985). In the end, it is shareholders who bear the agency costs of debt by paying higher interest rates than they would if they could credibly commit to abstaining from risk shifting activities. Therefore, it is beneficial for shareholders to pre-commit to constraints *ex ante* that will rule out certain behavior even though such actions may be rational *ex post* (Myers, 1977). Prior research has identified several contractual mechanisms that may limit risk shifting[6].

Convertible debt is a hybrid security that allows debtholders to share in the upside potential, thus limiting shareholders' gains from risk shifting (e.g., Jensen and Meckling, 1976; Smith and Warner, 1979; Green 1984; Jensen and Smith, 1985; Eisdorfer, 2008). The conversion option is like a call option written by equityholders to debtholders, whose value increases in the volatility of assets. A decrease in the value of straight debt will be (at least partially) offset by an increase in the value of the option component. Since shareholders are short this call option, their incentives to increase asset volatility are lower. Convertible debt, however, has a cost. Its presence may exacerbate the under-investment problem (Smith and Warner, 1979) as well as have adverse tax consequences due to the closeness of convertible debt to equity from the tax authorities' point of view.

Secured debt can also limit risk shifting since secured debtholders hold title to the collateral, making it impossible to sell these assets without debtholders' approval (e.g., Smith and Warner, 1979; Eisdorfer, 2008). Collateralizing an asset, i.e., issuing debt secured by an asset, also reduces expenses in case of foreclosure (Smith and Warner, 1979). The costs associated with secured debt include additional out-of-pocket costs such as administrative expenses and opportunity costs arising from restricting the firm from taking advantage of an opportunity to dispose of collateral at a gain.

[6] As discussed in Smith and Warner (1979) and Jensen and Smith (1985), debt-equity conflict cannot be solved by simply passing control of the firm to debtholders. First, bondholders would then have incentives to engage in "reverse risk shifting" by choosing suboptimally safe projects. Second, the degree of control debtholders can have in a firm is limited by common or statutory laws such as the Securities Act of 1934 and by the Trust Indenture Act of 1939.

Issuing short-term debt can be another solution if the debt matures before an investment is undertaken, eliminating the incentive for shareholders to engage in risk shifting (Myers, 1977; Barclay and Smith, 1995; Parrino and Weisbach, 1999; Eisdorfer, 2008). Using short-term debt instead of borrowing long-term provides debtholders with opportunities to adjust the terms of the contract based on the borrower's performance.[7] Suppose a firm borrows money to design a new production process that can be made more or less risky. If the debt is renegotiated before the completion of the project, creditors will be able to price the new debt according to the level of the riskiness of the process chosen by the firm. This setup effectively eliminates the shareholders' ability to extract value from the debtholders. Such a strategy, however, may be costly due to high renegotiation and administrative costs.

Including restrictive covenants in debt contracts is yet another contractual device that can be used to reduce risk shifting. Smith and Warner (1979) argue that restrictions on investment, disposition of assets, and M&A activity can mitigate risk-shifting. The contracting parties can also incorporate affirmative covenants[8] into debt contracts to decrease the potential for risk shifting. Smith and Warner (1979) note that a violation of an affirmative covenant provides a signal to the lender that can result in renegotiation of a debt contract. Current evidence confirms the frequent use of debt covenants to protect debtholders' investment (e.g., Dichev and Skinner, 2002; Billett et al., 2007; Chava and Roberts, 2008; Nini et al., 2009-a; Roberts and Sufi, 2009).

Verde (1999) provides evidence that the two major functions of debt covenants are a) preserving seniority and collateral; and b) ensuring that borrowers' actions are aligned with lenders' interests as long as the debt is outstanding. For example, many bank loan agreements

[7] Put differently, issuing debt with shorter maturity reduces managers' incentives to engage in risk shifting because the value of a shorter call option is not as sensitive to changes in the volatility of asset returns.

[8] An affirmative covenant is a clause in a debt contract that requires that firms take certain actions such as holding a certain amount of particular assets (e.g., cash), maintaining the firm's properties in good condition, or keeping certain metrics (mainly accounting-based) above pre-specified thresholds.

restrict asset sales outsides of the firm's regular course of business as well as contain cash flow sweeps requiring the borrower to apply the proceeds from asset sales toward the reduction of senior debt.

The mechanisms discussed above, however, cannot fully eliminate shareholders' incentives and ability to engage in risk shifting. First, since the investment set is not directly observable and cannot be directly contracted upon, it is nearly impossible, as well as inefficient, to control all of the firm's investment and production decisions.[9] Second, an innovation in the production technology that may not have existed when the debt was issued, can lead to significant changes in the firm's risk profile. As a result, restrictive covenants are not perfectly efficient in constraining risk shifting. Third, all of these mechanisms have attendant costs. In addition to renegotiation and administrative costs, firm value may also be affected by lost opportunities due to covenant tightness and debt security provisions over-restricting managers' choices. Therefore, a mechanism that enhances the degree of "contract completeness" or reduces these costs would benefit both the borrower and the lender.

2.3. Role of financial reporting

I argue that accounting quality complements other mechanisms that debtholders use to control agency conflicts. Several papers (e.g., Bushman and Smith, 2001; Lambert et al., 2008) suggest that high accounting quality can increase investment efficiency by improving the coordination between firms and investors.[10] Bushman and Smith (2001, p. 295), for example, argue that "financial accounting information is a direct input to corporate control mechanisms

[9] The absence of complete markets is necessary in order for agency conflicts to have any effect on the behavior of the parties involved. If market were complete, the agency problem could be solved through state-contingent contracts.
[10] Improving investment efficiency also includes increasing the productivity of assets in place or human capital.

designed to discipline managers" to direct resources toward their most productive use and to stop managers from expropriating wealth from investors.

Empirical evidence indicates that high accounting quality does indeed mitigate information asymmetry between managers and outside investors, thus improving project selection and lowering the cost of raising funds. Biddle, Hilary, and Verdi (2008) show that high accounting quality mitigates both under- and over-investment and increases firm profitability by aiding firms in the selection of more profitable projects. Bushman et al. (2006) provide cross-country evidence by showing that countries with a higher degree of a timely accounting recognition of economic losses (a measure of accounting quality) respond faster to declining investment opportunities by reducing the flow of capital to new investments.

Ball et al. (2008) argue that the recognition of financial information is more important to debtholders than to shareholders. They argue that such an asymmetry in demand exists due to differences in the way information affects the claimants' control rights. Upon receiving new information, shareholders can exercise their control rights via the board of directors. Debtholders, on the other hand, do not have direct means of influencing the firm's actions unless the firm violates a debt covenant, which provides debtholders with an option to assume control rights. Since most debt covenant thresholds are based on pre-specified accounting numbers, publicly available information that is not in the financial statements and has not otherwise been contracted upon does not provide debtholders with the controls rights necessary to influence the firm's actions.

Accounting quality is an inherently subjective concept and many attempts have been made to define and quantify it (e.g., Francis et al., 2004, Barth et al., 2008). SFAS No. 2, for example, considers timeliness, relevance, verifiability, reliability, unbiasness, comparability, and consistency to be desirable properties of financial reporting and disclosure information. Various parties, however, are likely to be interested in different dimensions of accounting quality based on the nature of their claims and contractual arrangement with the firm.

2.4. Dimension of accounting quality important to debtholders

Debtholders are interested in the dimensions of accounting quality that provide them with a credible signal of impending distress and help them take remedial actions. Due to the asymmetric nature of their claim's payoff, debtholders are more sensitive to increases than to decreases in default risk and tend to focus on the left tail of the earnings and net assets distributions. As a result, debtholders are typically more interested in receiving bad news than good news about the firm. However, if the value of the firm's assets falls far below the value of its debt, the importance of good news to debtholders also increases.

This idea is illustrated in Figure 1, which depicts a payoff diagram of a zero-coupon debt as a function the market value of assets (*Va*) at debt maturity. The value of assets can fall into two regions. The high-risk region captures the states of nature where the expected value of assets at debt maturity is closer to (or less than) the face value of debt (*F*) and thus the probability that the market value of assets will be below the face value of debt at debt maturity is non-trivial.[11] Debtholders in this region pay significant attention to the news about the firm since the value of their debt investment is sensitive to changes in the firm's economic outlook.

In the low-risk region, the value of assets is significantly higher than the face value of debt and the probability that *Va* will be less than *F* at debt maturity is small. Debtholders in this

[11] It is important to remember that according to the option-pricing framework for valuing equity, the probability of default is a function not only of asset value, but also of other standard parameters in the Black-Scholes-Merton equation. As a result, two firms having the same value of assets and face value of debt may have different default probabilities due to differences in other determinants of default risk (e.g., asset volatility and debt maturity).

region are not concerned about the value of their claims as much and, consequently, the value of debt will vary less in response to news about the firm. Their payoff function is almost flat in this region, i.e., debtholders are very likely to receive the face value of their debt investment back at maturity regardless of the value of assets. As a result, debtholders in this region are not as sensitive to either good or bad news since small changes in profitability, value, or risk profile of the firm do not affect their expected payoff at debt maturity.

The relative importance of good and bad news for debtholders varies at different points along the default spectrum. When the market value of assets is significantly below the face value of debt, the market value of debt becomes almost symmetrically sensitive to increases and decreases in the market value of assets and debtholders are concerned about the timeliness of both good and bad news. As the market value of assets increases, so does the importance of bad news relative to good news. Since debt payoff at maturity cannot exceed its face value, the market value of debt asymptotes to the face value but never crosses it, no matter how high the market value of assets is. On the other hand, if the company is performing poorly, the expected payoff to debtholders and the market value of debt fall as the market value of assets decreases (all the way down to zero, in extreme cases). Thus, if the asset value is high enough, a positive economic shock does not increase the value of debtholders' claims by much, while a negative economic shock can erode this value considerably.

I operationalize the idea of a differential demand from debtholders for good and bad news by using the asymmetric timeliness in the recognition of good versus bad news.[12] Asymmetric timeliness puts downward pressure on earnings and net assets, which brings bad news forward relative to good news and assures investors that gains are not overstated and losses are not

[12] Asymmetric timeliness is "the accountant's tendency to require a higher degree of verification to recognize good news as gains than to recognize bad news as losses" (Basu, 1997, p. 7).

understated (LaFond and Watts, 2008). Managers may withhold bad news to conceal problems and prevent creditors from forcing the firm into reorganization or bankruptcy. These incentives are especially strong for distressed firms. Graham et al. (2005) find that poorly performing firms delay the recognition of bad news hoping that the firm's health will improve in the future.[13] Healthy firms can also delay recognizing bad news to give themselves time for in-depth analysis, interpretation, and consolidation of bad news into larger news releases (Kothari et al., 2009).[14]

Asymmetric timeliness can reveal a shift in investment policy from safe, positive-NPV projects towards risky, negative-NPV ones by committing the management to recognizing the losses on new risky projects early (Ball and Shivakumar, 2005). Asymmetric timeliness can also help debtholders in detecting risk shifting even if new risky projects have a positive NPV. Arguably, this happens because as the volatility of an average project increases, so does the probability of a loss on this project (assuming the expected payoff increases less than volatility).

Asymmetric timeliness increases the effectiveness of debt contracts by enhancing the positive effects of creditor intervention following an incidence of covenant violation.[15] Zhang (2008) finds that firms with a high degree of asymmetric timeliness are more likely to violate debt covenants due to the downward effect of asymmetric loss recognition on earnings and net assets, the metrics that are commonly used in covenants (e.g., current ratio, net worth, debt to equity, etc). A timely covenant violation sends an early signal of potential distress to debtholders and gives them an option to review and renegotiate the debt agreement if necessary.

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[13] In their survey answers, most CFOs state that the management of a growing firm hopes that future earnings growth will offset reversals from past earnings management decisions (Graham et al., 2005).

[14] Some researchers have argued that managers may release bad news faster than good news to promote reputation for transparent reporting or to avoid potential lawsuits (e.g., Skinner, 1994 and 1997).

[15] Not all researchers agree with this point of view. Gigler et al. (2009, p. 768), for instance, provide theoretical evidence that "under very plausible conditions, we find that accounting conservatism, which affects the information content of accounting reports, actually decreases the efficiency of debt contracts."

By enhancing the timeliness of covenant violations, asymmetric timeliness speeds up the transfer of control rights from shareholders to debtholders.[16]

A typical debt covenant gives debtholders a legally enforceable right to demand an immediate debt repayment or an option to renegotiate the debt contract in case of a technical default.[17] Several papers show that such a transfer is an important contracting mechanism that can be used to reduce risk shifting and to improve operating performance. Chava and Roberts (2008) provide evidence that violations of the net worth and current ratio covenants lead to debtholders limiting the firm's future capital expenditures. Nini et al. (2009-b) corroborate these findings by showing that capital expenditure restrictions cause companies to lower actual expenditures following a technical default, which leads to lower value-dissipating investments and, as a result, to better performance and higher market values.

Cross-default provisions, that are common in public debt agreements, enhance the effect of asymmetric timeliness on the risk-shifting behavior. A typical cross-default provision clause in a debt covenant stipulates that a default on any of the company's outstanding loans will trigger a default on all of the company's loans. This feature provides an extra benefit to the lender by giving it more opportunities for contractual intervention and loan renegotiation if the company breaches a covenant in any of its debt agreements. For example, if the borrower breaches a net worth or a current ratio covenant on a loan from one lender, other lenders also receive the option to review and renegotiate their debt agreements. Cross-default provisions are especially important for public debtholders since public debt agreements contain fewer covenants that are more loosely set then do private debt agreements (e.g., Bradley and Roberts, 2004).

[16] It is important to notice that it is asymmetric timeliness and not just bad news timeliness that is important to debtholders. First, affirmative covenants are violated by losses and not by gains. Second, asymmetric timeliness prevents managers from recognizing gains early in order to cover up some of the losses.
[17] While empirical evidence shows that debtholders waive technical defaults in the majority of cases (e.g., Dichev and Skinner, 2002), they have a valuable option to influence management's decisions.

For accounting quality to affect risk shifting, there should be an equilibrium mechanism that ensures that firms that commit to a certain level of accounting quality *ex ante* do not renege on their promises *ex post*.[18] Prior literature has identified several such mechanisms that can arguably prevent firms from changing the level of asymmetric timeliness in their financial reports. First, contracting mechanisms, such as the use of "fixed GAAP" in covenants (Beatty et al., 2002) help borrowers commit to a pre-debt level of asymmetric timeliness. Many debt covenants also contain provisions expressly prohibiting firms from changing accounting methods or requiring detailed explanations of such changes. For example, the borrower may not be allowed to change from the double-declining to the straight-line depreciation method or will have to disclose the reasons for such a change in detail.

Second, reputation is another mechanism that helps keep borrowers from deviating from their *ex ante* accounting choices. Since accessing capital markets is a multi-period game, the ability of a company to obtain financing on favorable terms depends on its relationship with the lenders. Borrowers who choose to benefit short-term from changing their accounting quality may face negative reputational consequences in the future. They can find it more difficult and expensive to obtain future financing from the lenders if the latter cannot trust that the borrowers will keep the choices to which they have pre-committed before entering into the debt contract.

A third factor that can help keep borrower at the *ex ante* level of asymmetric timeliness is the threat of auditor litigation that is fairly common in practice. As the probability of default and potential bankruptcy rises, so does the auditor's exposure to litigation (Kothari et al., 1988; Lys and Watts, 1994; Watts, 2006). The auditor liability further increases when it becomes apparent

[18] Debtholders are not really concerned if managers of distressed firms become more conservative in their financial reporting choices. Lenders can always choose to ignore the distress signal or a covenant violation if they believe the firm's operations are fundamentally sound. Dichev and Skinner (2002) and Nini et al., (2009-b), among others, provide evidence that covenant violations are quite common and argue that the vast majority of them are waived.

that the firm has failed to disclosed all relevant bad news in a timely fashion (Skinner, 1997). Prior research has documented that auditors adjust their audit plan and increase the issuance of modified opinions as the probability of client default and litigation risk increase (Pratt and Stice, 1994). These findings suggest that auditors are likely to oppose any attempts by their clients to lower the level of asymmetric timeliness in their financial statements as default risk increases.

2.5. Predictions

Risk shifting involves managers taking high-risk (possibly negative-NPV) projects that increase the value of equity but decrease the value of debt. Eisdorfer (2008) finds that the relation between expected volatility and investment intensity is positive for distressed firms and interprets this as evidence of risk shifting behavior. I hypothesize that asymmetric timeliness can mitigate this relationship and predict that this effect is reflected in the one-period-ahead changes in asset value volatility in response to new corporate investments. New investments should then correspond to a decrease in asset volatility for firms with higher levels of asymmetric timeliness relative to those with lower levels of asymmetric timeliness.

I expect asymmetric timeliness to decrease risk shifting by making covenant violations more timely, thus providing debtholders with an earlier signal of poor performance and allowing them more time for remedial actions. A covenant violation gives creditors a contractual right to intervene if necessary and stop the management from engaging in wealth-dissipating activities. Thus, higher asymmetric timeliness will benefit debtholders by decreasing the firm's ability to engage in risk shifting and, in the long-run, will also benefit shareholders by reducing the deadweight loss they incur as a result of their risk shifting incentives.

H_1: Risk-shifting behavior decreases in accounting quality.

Financial reporting is just one of the sources of information about the firm. Stock market and information intermediaries such as analysts are other important sources that can also provide valuable information to investors and decrease the importance of financial reporting as a mechanism for mitigating debt-equity agency conflicts. If alternative sources of information are unavailable or if the information they provide is very noisy, accounting quality becomes an important communication channel between the company and investors. As a result, I expect that accounting information will be important for firms with poor information environments.

I proxy for the richness of information environment by partitioning the sample using four proxies: a) the cross-sectional median of the average daily closing bid-ask spread (scaled by the closing price) over the past year; b) the cross-sectional median of the average number of analysts that followed the firm over the past year; c) the cross-sectional median of the adjusted probability of informed trading (*AdjPIN*) score from Duarte and Young (2009).

H_2: Accounting quality has a stronger effect on risk shifting when the firm's information environment is poor.

Risk shifting is not costless. First, substituting one asset for another inevitably involves transaction costs. Second, increasing the business risk may increase the probability of future lawsuits against the firm. Third, risk shifting has opportunity costs. There are other ways equityholders can extract value from debtholders, such as excessive dividends payouts. The funds that are spent on risk shifting projects become unavailable to shareholders until the payoffs from the project are realized. Firms will engage in risk shifting only when the value transferred to equityholders exceeds the costs of risk shifting. Since the increase in the value of equity in response to increases in risk rises with the level of distress, I expect that risk shifting behavior will be stronger among firms in top distress quintiles. While this expectation is in line with an established body of finance literature, some researchers make an argument that risk shifting may be non-monotonic in distress risk or leverage (see Section 2.1. for more discussion on this issue). To examine the effect of distress on the relation between accounting quality on risk shifting, I estimate Equation (1) separately for the five quintiles partitioned on distress risk.

H_3: The effect of accounting quality on risk shifting increases in distress risk.

Since cash is usually the safest and the most liquid asset, the easiest way for a firm to engage in risk shifting is to use cash to buy a riskier asset. If the acquired asset is sufficiently risky, this action will benefit shareholders but hurt debtholders. Therefore, all else equal, it is easier for firms with more available cash to engage in risk shifting. This argument is the extension of an idea from Jensen (1986) that excess cash can negatively affect investment efficiency. Another way equityholders may want to use extra cash is to pay themselves a high dividend. However, this option is often unavailable due to debt covenants restricting dividends as well as due to the possibility of having such a payout deemed a fraudulent conveyance and having it clawed back by the bankruptcy court.

Several studies use the presence of cash as a proxy for agency conflicts and information asymmetry. Chava and Roberts (2008), for instance, find that the changes in investment are larger for firms with more cash following a covenant violation. Since risk shifting is expected to be less of a problem in firms with low cash, accounting quality may be less important for debtholders in this setting. I hypothesize that risk shifting behavior and the demand for high quality accounting information is higher for distressed firms with higher cash flows.

H_4: Accounting quality has a larger effect on risk shifting among distressed firms when CFO is high.

Diamond (1991) characterizes the U.S. debt markets as a continuum of access to monitoring and private information with bondholders being at the low end of the spectrum and banks being at the high end. Since public debt provides debtholders with limited ability to monitor borrowers, accounting quality is an important information source for them. Banks, to the contrary, have access to private information and can restrict suboptimal investment activities via loan covenants. As a result, they may not be as dependent on accounting quality as a monitoring and disciplining mechanism.

On the other hand, prior research has shown that private debt agreements contain more covenants and these covenants are also tighter and more detailed than those in public debt agreements (e.g., Verde, 1999; Bradley and Roberts, 2004). Roberts and Sufi (2008), for instance, show that 96% of all private debt agreements have a financial covenant. Thus, covenant violations, the primary mechanism through which accounting quality is expected to affect risk shifting, are expected to be more common in private debt. Besides, creditor intervention and renegotiation is likely to be more efficient for firms with private debt (Roberts and Sufi, 2008).

At the same time, most public debt has a cross-default provision (80% of observations in the Public Debt Sample described in Table I, Panel C have a cross-default provision), that allows bondholders to piggyback on covenant violations in private debt contracts. Thus, the effect of the source of debt on accounting quality seems to be ambiguous. I do not make a directional prediction regarding the strength of the relationship between accounting quality and risk shifting based on the source of debt.

H_5: The effect of accounting quality on risk shifting varies with the source of debt.

Several papers examined the effects of the Sarbanes-Oxley Act (SOX) adopted in late July of 2002 on corporate risk taking (e.g., Bargeron et al., 2009; Cohen et al., 2009). SOX introduced a number of corporate governance reforms, including certification requirements and severe penalties for top managers in case of fraud, independent audit committees, more rigorous internal controls, extensive disclosure regulation, etc. Bargeron et al. (2009) find that several measures of risk-taking decline among U.S. firms relative to a control group of non-U.S firms after the passage of SOX. Cohen et al. (2009) similarly find that the decline in risky investments in the post-SOX period exceeds what would be expected from changes in managers' compensation.

At the same time, one of the primary goals of SOX was to increase the provision of more timely and reliable information to internal and external parties (Dey, 2009). This fact, together with financial statements certification requirement and criminal penalties for C-level officers for misrepresentation, arguably led to more dependable accounting numbers. Since risk shifting is a subset of risk-taking activities, I hypothesize that the passage of SOX has decreased risk shifting behavior in non-financial firms and increased the role of accounting quality as a mitigating mechanism. Since SOX was adopted in late July of 2002, I divide the sample based on whether the fiscal year-end falls before versus after July 31, 2002 and examine the difference between the strength of evidence of risk shifting and accounting quality effects.

Any evidence of the effects of SOX has to be interpreted with caution since a number of confounding events that could have affected both the firm's risk-taking and the information environment took place in the U.S. close to the passage of SOX. The passage of Regulation Fair Disclosure (Reg FD) in October 2000 and a series of high-profile corporate scandals starting from the fall of Enron in December 2001 are two examples of such events (Dey, 2009). Reg FD could have altered the firm's information environment by effectively preventing managers from using analysts as a channel for incorporating news into stock prices. The fall of Enron (together with other corporate scandals) caused the loss of confidence in accounting information and encouraged market participants to exercise more effort in monitoring and disciplining managers.

H_6: Risk shifting decreases and the mitigating effect of accounting quality increases after the passage of SOX.

An important working assumption made in this study is that managers interests are aligned with the interests of shareholders and that the former will act in the benefit of the latter. Prior research has shown that this may not always be the case and that to protect their human capital and private benefits of control, managers may act more conservatively than shareholders would desire. This has been shown both theoretically and empirically (e.g., Hirshleifer and Thakor, 1992; Eckbo and Thorburn, 2003). The less diversified managers' human capital is and the more important the private benefits of control are for managers, the more risk averse they are likely to be in setting corporate investment policy (John et al., 2008).

Eisdorfer (2008) tests whether the extent to which managers' and shareholders' interests are aligned affects the strength of the relationship between financial distress and risk shifting. Following Morck et al. (1988) and Mehran (1995), he uses the percentage of equity owned by top managers as a proxy for the degree of the alignment of interests. The results seem to hint that the severity of risk shifting increases in the degree of alignment of interests between managers and shareholders. However, these results are not statistically significant at conventional confidence levels. While I do not investigate the issue of the misalignment of managers' and shareholders' interests in this study, the arguments and the results discussed above suggest if such a misalignment does affect risk shifting, my research design biases against finding the evidence against the null hypotheses.

3. Research Design

3.1. Model specifications

I use the implied volatility of the market value of assets (asset volatility) as a measure of the firm's operating risk. If risk shifting behavior does exist, I expect it to manifest itself in increases in firm asset volatility. However, evidence of positive changes in asset volatility is not by itself sufficient to suggest the presence of risk shifting behavior. Risk shifting is an *investment* distortion that occurs as a result of a conflict of interests between shareholders and debtholders. Consequently, it should be measured as an effect of investments on asset volatility.

To test whether accounting quality affects the risk shifting behavior (H_1), I use a linear regression model that relates changes in idiosyncratic asset volatility to changes in investment intensity (scaled investment). The coefficient on the changes in investment intensity is a measure of risk shifting. Eisdorfer (2008) finds that changes in investment intensity are positively associated with the next period's changes in asset volatility ($\beta_1 > 0$) for a sample of distressed firms, which is consistent with the argument that risk shifting affects asset volatility. I use the following specification to test the predictions.

$$\Delta SigA_{it+1} = \beta_0 + \beta_1 \times \Delta Invest_{it} + \beta_2 \times AccQ_{it} + \beta_3 \times \Delta Invest_{it} \times AccQ_{it} + Controls_{it} + \varepsilon_{it} \qquad (1)$$

I add a proxy for the level of accounting quality to the model and an interaction effect between the level of accounting quality and the changes in investment intensity. Although I do not make any predictions about the direct effect of accounting quality on the changes in asset volatility (β_2), I do expect that accounting quality will decrease investment distortions caused by risk shifting behavior. That is, high accounting quality will be associated with a decrease in the positive relationship between changes in investment intensity and asset volatility ($\beta_3 < 0$).

The variables in the model above are defined as follows.[19] The change in firm-specific asset value volatility in period *t + 1*, $\Delta SigA_{t+1}$, is measured using the Merton (1974) model.[20] The change in investment intensity from period t to period *t + 1*, $\Delta Invest_t$, is measured as $Capex_t / PPE_{t-1}$ less its one-period lag.[21] I use the *C_Score* measure from Khan and Watts (2009) as a measure of asymmetric timeliness (*AsymTime*).[22]

I control for alternative contracting mechanisms that have been argued to affect risk shifting. I control for the proportion of short-term debt in the firms' capital structure by using the ratio of short-term debt to total debt (*ST Debt*), the presence of secured debt (*Secured*), asset sale restrictions (*Asset Sale Restr*), and investment restrictions (*Invest Restr*) in outstanding debt contracts. I include these four variables in the regression as stand-alone variables as well as interact them with the changes in investment intensity (Δ*Invest*).

I control for firm-specific characteristics that may affect the firm's business risk as well as its investment policy, such as size *(Size)*, leverage (*Leverage*), and market-to-book (*MB*). I control for profitability using the return on assets (*ROA*) and cash flow from operations (*CFO*). I include firm age (*Firm Age*) in the regressions to alleviate the concern that the stage of the firm's business cycle may affect both asset volatility and the firm's accounting quality. Industry-wide controls include S&P 500 return for the past 12 months (*S&P 500 Ret*), expected market

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[19] See Appendix 2 for more detailed variable definitions.
[20] See Section 3.2 and Appendix 3 for detail.
[21] This is a widely accepted measure of investment in the literature (e.g., Hubbard, 1998; Chava and Roberts, 2008; Eisdorfer, 2008; Biddle et al., 2008). I use an alternative measure of investment in the robustness section of the paper (Section 6.3).
[22] See Section 3.3 for details on the estimation of *AsymTime*.

volatility (*Exp Volatility*), the spread between the yield of Baa- and Aaa-rated long-term corporate "vanilla" bonds (*Default Spread*), and the risk-free rate (*Riskless Rate*).

To test H_2, I partition the sample by cross-sectional sample medians of each of the three proxies for the richness of the firm's information environment. The first proxy is the average daily closing bid-ask spread over the past year (*Bid-Ask*). The second proxy is the average number of analysts that followed the firm in the past year (*Analyst*). The third proxy is the adjusted probability of informed trading score (*AdjPIN Score*).[23] I expect that accounting quality will play a larger role in mitigating risk shifting for firms with poor information environment, i.e., for firms with high *Bid-Ask*, low *Analyst*, and high *AdjPIN Score*. Specifically, I expect that $\beta_3(\textit{Poor Info Envir}) < \beta_3(\textit{Rich Info Envir})$.

To test H_3, I estimate Equation (1) for each of the *Distress* quintiles in order to examine whether the level of distress risk affects risk shifting and the mitigating effect of accounting quality. I expect the risk shifting effect ($\beta_1 > 0$) and the mitigating effect of asymmetric timeliness ($\beta_3 < 0$) will be stronger in higher distress risk quintiles. I do not use the distress interaction term here because of a distinct possibility that the relation between risk shifting and the level of distress may be non-monotonic.

To test H_4, I partition the top distress quintile by the cross-sectional median amount of cash flow from operations in a given year scaled by lagged total assets. Specifically, I predict that $\beta_3(\textit{High CFO}) < \beta_3(\textit{Low CFO})$.

To test H_5, I partition the sample into two subsamples. The first subsample includes those observations that only have public debt but no syndicated debt. The second subsample

[23] I obtained PIN estimates from Jefferson Duarte and Lance Young from the University of Washington. I use a measure of asymmetric information *AdjPIN* from Duarte and Young (2009), which the authors argue is a better measure of information asymmetry that the original PIN measure from Easley and O'Hara (2004).

includes those observations that only have syndicated but no public debt. I do not use the observations that have both public and syndicated debt to test H_5 since my goal is to try to disentangle the effect of the source of debt on the relation between asymmetric timeliness and risk shifting. I control for debt contract features that are present only in public or syndicated debt. For the first subsample, I control for whether a firm has convertible debt (*Convertible*) or a cross default provision in its debt contracts (*Cross Default*). For the second subsample, I add a control for whether a firm has a leveraged syndicated loan (*Leveraged*) or a performance pricing feature (floating spread over LIBOR) in its debt contract (*Perform Pricing*).

To test H_6, I partition the sample into the pre-SOX and the post-SOX period. Since SOX was adopted in late July of 2002, I divide the sample based on whether the fiscal year-end falls before versus after July 31, 2002.[24] I expect that accounting quality will have a larger effect after the adoption of SOX, i.e., $\beta_3(Pre-SOX) < \beta_3(Post-SOX)$.

One econometric concern that may affect the results is correlations among residuals in Equation (1). While residuals estimated in models where the dependent variable is measured in changes usually exhibit low correlation, I address a potential concern of correlations in the error structure using an approach suggested by Petersen (2009). The residuals in Equation (1) are estimated with firm fixed-effects and are clustered by year.[25]

Another concern is potential endogeneity. If decisions about the level of business risk are made simultaneously with investment or accounting choices, the endogenous nature of this relationship may bias the results. I argue that two factors can alleviate the endogeneity concern.

[24] I also use the December 31, 2002 as a cutoff for robustness and the results remain qualitatively unchanged.

[25] I do not implement a two-dimensional clustering procedure (by year and by firm) due to the insufficient number of observations in firm clusters. The results in Figure 5 of Peterson (2009) suggest that each cluster should have at least 10 observations to allow for an estimation of the correlation structure without a large bias. While the sample in the paper spans 12 years (from 1995 to 2006), each firm appears in the sample approximately 5 times (median = 4 times). As a result, clustering by firm will not yield unbiased estimates.

First, all three main firm characteristics are measured in different time periods. As Figure 2 illustrates, accounting quality is measured prior to t = 0, investment is measured in the period between t = 0 and t = 1, and changes in asset volatility are measured in the period between t = 1 and t = 2. I argue that regressing one-period-ahead volatility changes on lagged investment and accounting quality is a way to reduce endogeneity since a significant part of accounting and investment choices in the firm's financial statements is fixed by prior investment and production decisions. This argument is similar to the one advanced by Frankel and Litov (2009). Second, using changes instead of levels for asset volatility and investment intensity ensures that these variables are not sticky, which also helps reduce the endogeneity concern.

3.2. Measures of asset volatility and distress

To estimate the firm-specific asset value volatility *(SigA)* and distress risk (*Distress*), I use a technique similar to that used in a number of recent papers (e.g., Hillegeist et al., 2004, Vassalou and Xing, 2004; Campbell et al., 2008) and solve a system of two non-linear equations. The first equation (the BSM equation) is based on the Merton (1974) model, which expresses the value of the firm's equity as a call option on the firm's assets using the Black-Scholes-Merton option-pricing framework.[26] The second equation represents the relation between the volatility of equity and asset returns derived from Ito's lemma:[27]

Equation 1: the Black-Scholes-Merton equation for the value of equity with dividends:

$$V_E = V_A \times e^{-\delta T} N(d_1) - TL \times e^{-rT} N(d_2) + V_A \times \left(1 - e^{-\delta T}\right) \quad (2)$$

Equation 2: the optimal hedge equation with dividends:

[26] Variable descriptions and other details on the model are provided in Appendix 3.

[27] The derivation of the optimal hedge equation is presented in Appendix 4.

$$SigE = \left[e^{-\delta T} N(d_1) + \left(1 - e^{-\delta T}\right)\right] \times \frac{V_A}{V_E} \times SigA \tag{3}$$

The system is simultaneously solved for the unobservable variables V_A and $SigA$, the market value of assets and asset volatility, respectively. I estimate *Distress* as the probability that the firm's asset value falls below the book value of its total liabilities (*TL*) at debt maturity[28] (after T years from time t = 0) assuming that the firm's asset value (continuous rate of growth in assets) is log-normally (normally) distributed.[29] Formally,

$$Distress = N\left(-\frac{\ln(V_A/TL) + \left[\mu - \delta - \left(SigA^2/2\right)\right]T}{SigA \times \sqrt{T}}\right) \tag{4}$$

where μ is estimated as $\hat{\mu} = \ln V_{A,t} + \delta - \ln V_{A,t-1} + 0.5SigA^2$

3.3. Measure of accounting quality

I use a firm-year measure of asymmetric timeliness, *C-Score*, developed by Khan and Watts (2009). The authors provide evidence that C-Score captures both cross-sectional and time-series variation in the level of firm's asymmetric timeliness and can predict a firm's asymmetric timeliness for up to three years in the future. This firm-year measure is estimated by treating the asymmetric timeliness coefficient from Basu (1997) as a linear function of time-varying firm-specific characteristics that are predicted to vary with the level of conservatism (size, market-to-book, and leverage).

$$AsymTime_{it} = C\_Score_{it} \equiv \beta_{4it} = \lambda_{1t} + \lambda_{2t}Size_{it} + \lambda_{3t}M/B_{it} + \lambda_{4t}Lev_{it} \tag{5}$$

The firm-specific time-varying coefficients (λ_{jt} with j = 1 to 4) are estimated as follows:

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[28] I use the procedure proposed by Barclay and Smith (1995-a) to estimated the expected time to maturity (T). The details of this procedure are explained in Appendix 3.

[29] Strictly speaking, *Distress* is not an actual default probability since it does not correspond to the true default probability in large samples. However, since this measure is a monotonic non-linear transformation of a true default probability, it should produce similar distress rankings.

$$NI_{it} = \beta_{1t} + \beta_{2t} D_{it} + R_{it}(\mu_{1t} + \mu_{2t} Size_{it} + \mu_{3t} MB_{it} + \mu_{4t} Lev_{it}) + D_{it} R_{it}(\lambda_{1t} + \lambda_{2t} Size_{it} + \lambda_{3t} MB_{it} + \lambda_{4t} Lev_{it}) + \varepsilon_{it} \quad (6)$$

This measure of accounting quality is based on the notion of the differential verifiability required for the recognition of accounting gains and losses developed by Basu (1997). Positive returns proxy for good news and negative returns proxy for bad news.[30] By allowing the sensitivity of net income to vary for the subsamples of positive and negative returns (i.e., news), the β_4 coefficient captures the level of asymmetric timeliness that is present in the financial statements. By incorporating both cross-sectional and time-series variation in size, market-to-book, and leverage, β_4 captures the firm-year-specific level of asymmetric timeliness.

I follow the procedure described in Khan and Watts (2009) to estimate *AsymTime*. Specifically, I eliminate observations with missing data for any of the variables used in Equation (1) and also with negative book value of equity or total assets. Returns are calculated by cumulating monthly returns backwards starting from the third month after the fiscal year-end. Equation (6) is then estimated for each year and cross-section-specific λ-coefficients are substituted in Equation (5) together with firm-specific measures of *Size*, *MB*, and *Lev* to calculate *AsymTime*. The estimates are ranked into deciles by fiscal year and scaled to range from 0 to 1.[31]

[30] The Basu measure takes the stock price as exogenous and thus implicitly assumes that the market is efficient.
[31] I also estimate this model using a rolling panel consisting of all firm-year observations in each 3-digit SIC code in the current and the four prior years. The two estimation techniques yield qualitatively similar empirical results.

4. Sample and Descriptive Statistics

I use several different data sources to construct a dataset combining contract-specific information on public and private debt issues with various accounting and financial data. I use the Mergent Fixed Investment Securities Database (FISD) to obtain a sample of public debt issuances (the Public Debt Sample). I use the Securities Data Corporation's (SDC) database to obtain a sample of syndicated loans (the Syndicated Loan Sample).

Combining the two samples and aggregating the data at the firm-year level creates the main sample used in the study (the Debt Covenant Sample), which consists of 11,238 firm-years from 2,344 unique firms and incorporates contract-specific information from 7,680 public and private debt issues. I also use data from CRPS and Compustat to obtain descriptive statistics of all Compustat firms for comparison purposes (the Compustat Sample) and to obtain various firm-specific data items. Each one of the five above-mentioned samples is described below.

4.1. Public Debt Sample

I use the Mergent Fixed Investment Securities Database (FISD) to obtain a sample of public debt issuances between January 1995 and December 2005. The FISD contains information on terms and conditions of bond issues (on over 200,000 borrowers) as well as information on exchange transactions reported by property and life insurers, and state insurance departments. I follow prior research to construct a sample of firms that have information on contractual features of public debt (e.g., Billett et al., 2007; Nikolaev, 2007). The sample excludes foreign bonds, bonds denominated in foreign currency, bond issues by financial firms (SIC codes 6000 to 6999), and U.S. government bonds. I then select debt issues from 1995 until 2005 that have covenant data available.

Initially, the Public Debt Sample contains 8,800 debt issues from 3,416 firms (Table I, Panel A). Panel B provides descriptive statistics for the Public Debt Sample on a deal level and before it is merged to Compustat. The mean (median) amount of a debt issuance is $300 ($200) million and the mean (median) years-to-maturity is 11.8 (9.7) years, indicating that public debt tends to be fairly long-term (75% of the issues have maturity of over 6 years). The vast majority of issues are senior (95%), which is consistent with Billett et al. (2007) findings that the FISD contains very few junior debt issues, and 30% of all issues are secured.

I collect information on four different types of bond covenants. The majority of debt issues have M&A restrictions (93%) and asset sale restrictions (94%). However, very few debt contracts have built-in investment restrictions (3%). This evidence is similar to prior findings (Billett et al., 2007; Beatty et al., 2007) and suggests that the costs of over-restricting firm investment choices outweighs the benefits of reduced wealth transfers. In addition, approximately two-thirds of debt issues (64%) contain cross-default provisions.

I aggregate the FISD data at the firm-level and match it to Compustat. For each match, I verify the company name and industry membership (based on the 3-digit SIC code). The resulting sample consists of 12,489 firm-years from 2,034 firms that have at least one public debt issue outstanding; 5,761 issues can be merged to Compustat (Table I, Panel A). Table I, Panel C provides descriptive statistics for the Public Debt Sample on a firm-year level and after merging it to Compustat. The mean (median) amount of public debt outstanding per firm-year is $683 ($260) million. The mean (median) of the average face-value-weighted time to maturity is 8.6 (6.7) years. Almost 30% of firm-years have a public deal originating in that year. The statistics on other features are similar to those in Panel B.

4.2. Syndicated Loan Sample

I use the Securities Data Corporation's (SDC) database to obtain a sample of syndicated loans issued between January 1995 and December 2005. The sample excludes loans made to non-U.S.-based companies, loans denominated in foreign currency, and loans made to financial firms (SIC codes 6000 to 6999). I then select syndicated loans issued from 1995 until 2005 that have covenant data available. Initially, the Syndicated Loan Sample contains 8,099 syndicated loan deals and 4,411 individual firms (Table I, Panel A). Panel B provides descriptive statistics for the Syndicated Loan Sample on a deal level and before merging it to Compustat.

The mean (median) amount of loan is $368 ($150) million and the mean and the median loan maturity is 4.1 years, which is about two times shorter that the maturity of an average public debt issue. In fact, 75% of the issues have the maturity of less than 5 years. Virtually all syndicated loans are senior, consistent with Yago and McCarthy (2004). Secured loans constitute 57% of the sample, while 55% of the loans are leveraged. Approximately half of the loans have M&A restrictions (51%) and asset sale restrictions (49%). Restrictions on capital expenditures are observed in 39% of the loans, which is close to the ratios observed in prior research (Beatty et al, 2007; Nini et al., 2009). Similarly to the statistics in Roberts and Sufi (2009), most loans (79%) have performance pricing features (floating spread over LIBOR).

I aggregate the SDC data at the firm-level and match it to Compustat. For each match, I verify the company name and industry membership (based on the 3-digit SIC code). The resulting sample consists of 12,788 firm-years from 2,638 firms that have at least one syndicated loan outstanding; 5,511 loans can be merged to Compustat data (see Table I, Panel A). Table I, Panel C provides descriptive statistics for the Syndicated Loan Sample on a firm-year level and after merging it to Compustat. The mean (median) amount of syndicated debt outstanding per firm-year is $599 ($220) million. The mean (median) of the average face-value-weighted time to maturity is 2.7 (2.5) years. A third of firm-years have a syndicated loan deal that originated in that year (*Deal Year* = 0.33). The descriptive statistics on other features are similar to those shown in Panel B.

4.3. Debt Covenant Sample

To obtain a sample of firms that have either public or syndicated debt outstanding and have details on debt covenants, I merge the Public Debt Sample with the Syndicated Loan Sample. The resulting Debt Covenant Sample spans 12 years (from 1995 until 2006),[32] contains 20,274 firm-year observations from 3,573 firms, and covers 11,272 debt issuances, either public or syndicated (see Table I, Part A). The requirement that the sample has non-missing data for the main variables (asset volatility, investment intensity, and distress risk) and the control variables reduces the sample to 11,238 firm-year observations from 2,344 firms. From these, 6,625 observations from 1,291 firms have public debt outstanding, 7,897 observations from 1,861 firms have a syndicated loan outstanding, and 3,284 observations from 808 firms have both (see Table I, Panel A).

To test hypotheses that are conditional on the level of distress (H_3 and H_4), I rank all observations in the Debt Covenant Sample into *Distress* quintiles within each fiscal year. The resulting top distress quintile, for example, consists of 2,246 observations from 1,183 firms; 1,432 observations from 710 firms have public debt; 1,486 observations from 863 firms have private debt; and 672 observations from 375 firms have both.

[32] The Debt Covenant Sample covers an extra year that is not covered by either the Public Debt Sample or the Syndicated Loan Sample (2006). This happens because I include 2006 observations with non-missing data for the main variables that have outstanding public or syndicated debt.

The sample composition is presented in Table II. Panel A shows the observations frequency breakdown by year. Relative to the Compustat comparison group, a disproportionate fraction of observations in the Debt Covenant Sample and the top distress quintile have fiscal years ending in 2002 – 2006, while years 1995 – 1997 are underrepresented. Panel B of Table II presents the industry composition based on the Fama and French (1997) industry classification (12 industry groups).[33] Manufacturing, energy, telecommunications and wholesale and retail industries are overrepresented while business equipment and healthcare industries are underrepresented in the Debt Covenant Sample relative to the Compustat Sample (see below).

4.4. Compustat Sample

The Compustat Sample is retrieved from the 2008 Compustat annual primary, secondary, tertiary and full-coverage research files and consists of all available firm-year observations from U.S.-based non-financial firms that have fiscal year ending between January 1995 and December 2006. I require that all observations have non-missing SIC code, cash (data item 1), net income (data item 172), and operating cash flow (data item 308). I also require that all observations have positive total assets (data item 6) in the current and the previous years, total liabilities (data item 181), net sales (data item 12), common share price (data item 199), and common shares outstanding (data item 25). In addition, I remove the observations with negative book value of equity (data item 60) to make the Compustat Sample comparable to the Debt Covenant Sample. Observations with negative book values are excluded from the calculation of *AsymTime* are not in the Debt Covenant Sample. The resulting sample has 54,388 firm-years from 9,048 firms.

[33] Industry group definitions are available from Kenneth R. French's website at http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/Data_Library/changes_ind.html

4.5. Descriptive statistics

Table III, Panel A presents the comparison between the statistics for the Debt Covenant Sample and the Compustat Sample. I winsorize all calculated variables (*Firm Age, MB, Leverage, ROA, CFO,* and *Cash*) at 1% and 99% to control for non-linearities and outliers.[34] An average firm in the debt covenant sample is over two times larger (based on *Ve*, *TA*, or *Sales*), more profitable (based on *CFO*, *ROA*, and the incidence of losses), and older (20.3 vs. 17.5 years) than an average firm on Compustat. The former is also more leveraged (0.61 vs. 0.48) and has two times less cash as a fraction of its total assets (0.11 vs. 0.22). The difference in cash holdings may be due to the fact that an average firm in the Debt Covenant Sample has better investment opportunities that an average firm in the Compustat Sample.

Table III, Panels B and C present descriptive statistics for the Debt Covenants Sample and the top distress quintile, respectively. An average distressed firm is smaller than its counterpart in the Debt Covenant Sample as measured both by market-based (*Va* and *Ve*) or accounting-based measures (*Sales*, *TA*, and *BVE*). It has lower *MB* (1.48 vs. 2.68), higher *Leverage* (0.71 vs. 0.61), and less short-term debt (*St Debt* is 0.11 vs. 0.16). An averaged distress firm is riskier as evidenced by higher expected default probability (*Distress* is 0.30 vs. 0.07) over the next 3 years, higher asset volatility (*SigA* is 0.39 vs. 0.27) and equity volatility (*SigE* is 0.70 vs. 0.45). It has performed worse economically as shown by lower prior 12-month return (*Ret* is -0.22 vs. 0.18), operating cash flow (*CFO* is 0.04 vs. 0.09), return on assets (*ROA* is -0.05 vs. 0.02), and higher incidence of losses (*Loss* is 0.55 vs. 0.25).

Revealingly, an average distressed firm exhibits approximately the same level of accounting quality as healthy firms (*AsymTime* is 0.13 versus 0.14). This observation suggests that firms, on average, do not alter their accounting choices significantly as economic conditions

[34] All results are robust to various winsorizing cutoffs as well as to truncation.

deteriorate. Investment intensity (*Invest*) is the same for both healthy and distressed firms (0.14), suggesting that firms try to follow their long-term investment strategy even in distress. Distressed firms are also younger (*Firm Age* is 16.2 vs. 20.3), have lower analyst following (*Analyst* is 6.3 vs. 8.3) and higher bid-ask spread (*Bid-Ask* is 3% vs. 2%).

Most observations in the Debt Covenant Sample are financially healthy firms as indicated by a low probability of default (for the 75% of observations the cumulative probability of default, *Distress*, over the next 3.2 years is less than 4%). This cutoff is roughly comparable to the cumulative default rate on BBB-rated (investment grade) corporate bonds between 1971 and 2004 (Altman and Hotchkiss, 2006, p. 174). Most firms in the top distress quintile have a high probability of default (for 75% of the observations, the cumulative probability of default over the next 3.5 years is 30%). This cutoff is roughly comparable to the cumulative default rate on BB-rated (junk) corporate bonds. The mean value of *Distress* in the top distress quintile (30%) is reasonably close to the cumulative default rate on CCC-rated corporate bonds. Overall, firms in the top distress quintile exhibit characteristics typical of firms in financial distress.

5. Empirical Results

5.1. Univariate results

Table IV reports pairwise correlations among the measures of asset volatility, investment intensity, distress, accounting quality, and firm-specific controls for the Debt Covenant Sample (Panel A) and the top distress quintile (Panel B). The upper right-hand portion of each panel displays the Pearson product-moment correlations, and the lower left-hand portion displays the Spearman rank-order correlations.

The correlations reveal that the one-period-ahead change in asset volatility ($\Delta SigA$) is positively correlated with the change in investment intensity ($\Delta Invest$) and distress *(Distress)* for both the Debt Covenant Sample and the top distress quintile. This evidence is consistent with the expectation that asset riskiness increases in response to new investments. The change in investment intensity is negatively correlated with the level of distress, suggesting that distressed firms tend to invest less than healthy firms, either due to lack of resources and investment opportunities, or because of contractual restrictions.

5.2. Main results (H_1)

Table V presents the results of testing H_1 for the Debt Covenant Sample using Equation (1), both with and without *ST Debt, Secured, Asset Sale Restr*, and *Invest Restr* and their interactions with $\Delta Invest$.[35] The coefficients on $\Delta Invest$ (β_1) and $\Delta Invest \times AccQ$ (β_3) are of particular importance. A positive β_1 indicates that the change in investment intensity is positively associated with the change in asset volatility. A negative β_3 suggests that accounting

[35] The only difference across the six different specifications of Equation (1) is the inclusion of the four contractual control variables (*ST Debt*, *Secured*, *Asset Sale Restr*, and *Invest Restr*) and their interactions with $\Delta Invest$. Column (1) presents the results without including any of the four controls. Columns (2) – (5) include one control (and its interaction with $\Delta Invest$) at a time while Column (6) includes all four controls (and their interactions with $\Delta Invest$).

quality mitigates risk shifting. Since *AsymTime* is a decile measure scaled from 0 to 1, β_3 can be interpreted as the effect moving from the lowest decile of accounting quality to the highest has on risk shifting.

The β_1 coefficient is positive and significant at the 5% level (for a two-tailed test) in all six specifications. This evidence is similar to that of Eisdorfer (2008) and is indicative of risk-shifting behavior among distressed firms. The β_3 coefficient is negative and significant at the 5% level (for a two-tailed test) in all six specifications. The absolute value of β_3 relative to the absolute value of β_1 is approximately 0.6 (= 10.13 / 16.73), indicating that moving from the lowest accounting quality decile to the highest one can reduce the sensitivity of risk changes to new investments by about 60%. These results are robust to including the controls for the proportion of short-term debt in the capital structure (*ST Debt*), for the presence of secured debt (*Secured*) as well as for asset sale (*Asset Sale Restr*) and investment (*Invest Restr*) restrictions.

5.3. Partitioning by the richness of information environment (H_2)

Results shown in Table VI provide strong evidence consistent with the prediction that the mitigating effect of accounting quality on risk shifting is stronger when the firm's information environment is poor. Partitioning the Debt Covenant Sample by any of the three proxies for information environment yields consistent results. Accounting quality has a stronger effect on risk shifting when the average daily bid-ask spread is high, the analyst following is low, and the *AdjPin Score* is high. Formally, β_3 is statistically different for the subsamples in each of the three tests (at least at the 5% level) suggesting that the effects of high accounting quality increase as the firm's information environment deteriorates.

5.4. Partitioning by the level of distress risk (H_3)

Table VII presents the results of testing H_3 within all distress quintiles. Risk shifting effects (β_1) and accounting quality effects (β_3) are significant at the 5% level only in the two top distress quintiles. Neither coefficient is significant in the three lowest distress quintiles. The test for the difference in coefficients reveals that β_1 and β_3 in the 5th quintile are not statistically different from their counterparts in the 4th quintile. However, β_1 and β_3 in the 5th quintile are different from those in the 1st quintile (at the 1% and 10% levels, respectively) and β_1 and β_3 in the 4th quintile are different from those in the 3rd quintiles (at the 5% and 1% level, respectively).

Estimating Equation (1) for the first 3 quintiles (1st – 3rd pooled) versus the top 2 quintiles (4th and 5th pooled) reveals that both β_1 and β_3 are different for the two subsamples (at the 1% level each). This result is consistent with the expectation that risk shifting is stronger when the level of distress is higher. Interestingly, the adjusted R-squared decreases from 20.4% for the healthiest firm-years to 6.4% in the most distressed firm-years.

The significant coefficient on *ST Debt* suggest that increasing the proportion of short-term debt in the capital structure by one standard deviation causes an 18% drop in risk shifting (= 0.24 x 38.90 / 51.07). The coefficient on *Asset Sale Restr* is also statistically significant and its magnitude suggests that the presence of this covenant in one of the firm's debt agreements causes a 32% drop in risk shifting (= 16.29 / 50.70). The coefficient on *Secured* is statistically significant at the 10% level, but has a positive sign. It appears that firms with secured debt are more likely to engage in risk shifting than firms without secured debt.[36] The coefficient on *Invest Restr* has the expected minus sign, but it is statistically insignificant.[37]

5.5. Partitioning by the availability of cash (H_4)

Table VIII shows the results of testing H_4. The evidence seems to suggest that when cash flow from operations is relatively high among distressed firms, accounting quality has a mitigating effect on risk shifting, while if the cash flow from operations is low, it does not. The value of β_3 relative to the value of β_1 is approximately two times higher, which suggests that the effect of accounting quality on risk shifting in firms with high cash flow is double that in firms with low cash flow. However, the test of the difference in the coefficients between the two subsamples reveals that neither one is significantly different from its counterpart (p-value > 10% in both cases). Thus, this test is inconclusive.

5.6. Partitioning by the source of debt (H_5)

Table IX presents the results from testing H_5 by running the regression separately for subsamples of the Debt Covenant Sample partitioned by the source of debt (public debt only versus syndicated debt only). The evidence of risk shifting and the mitigating role of accounting quality is statistically significant only in the Public Debt Sample. The relative magnitude of β_3 and β_1 suggests that risk shifting is more than two times lower for firms in the top accounting quality decile than for their counterparts in the bottom accounting quality decile (28.64 / 49.65).

[36] Once possible explanation to this observation may be the fact that secured creditors worry less about their debt investment *ex post* and, as a result, do not exert as much effort into monitoring and disciplining managers.
[37] Nini et al. (2009) provide evidence that capital expenditures restrictions constrain firm investment. However, as the authors note, "capital expenditures … are commonly set as s nominal dollar amount for a given year". Constraining the level of allowed capital expenditures says nothing about the constraining the level or risk of these expenditures. That is, a distressed firm with a capital expenditure restriction in place may still chose to invest the allowed amount into suboptimally risky assets.

In addition, β_1 and β_3 are statistically different from their counterparts in the two subsamples at the 1% confidence level. This evidence suggest that accounting quality is an important mechanism for bondholders that lowers the agency cost of debt, while it is less useful to private debtholders due to their access to additional information channels unavailable to bondholders.

Panels B and C repeat the analysis for each subsample while introducing two pairs of contractual features that are available only for the corresponding subsamples: a) the presence of a convertibility option or a cross default provision in public debt (*Convertible* and *Cross Default*); and b) the leveraged loan status and performance pricing features in syndicated debt (*Leveraged* and *Perform Pricing*). The presence of convertible debt has a significant influence on the reduction of risk shifting, although its effects (β_3 = −10.80) are not as strong as those of accounting quality (β_3 = −33.54). The presence of cross-default provisions is also significant, but the sign of the coefficient is opposite from what I expected. The presence of leveraged loans or of performance pricing features in syndicated debt does not appear significant.

5.7. Partitioning by the passage of SOX (H_6)

The results from testing H_6 are shown in Table X. The β_1 coefficient is statistically significant in the pre-SOX period, while it is not statistically significant in the post-SOX period. The magnitude of β_3 is higher in the post-SOX period. Both results are consistent with the expectations that the adoption of SOX decreased corporate risk taking as well as made accounting information more dependable and efficient for debt contracting purposes. Formally, the difference between the two pairs of coefficients is not significant at conventional confidence levels (p-value > 10% in both cases). Thus, the results of the test are inconclusive and it is difficult to make any inferences from this test.

6. Robustness Tests

6.1. Using $\Delta SigE$ instead of $\Delta SigA$

To address the concern regarding the difficulty of obtaining accurate estimates of asset volatility, I use the change in the firm's one-period-ahead equity volatility, $\Delta SigE$, as the dependent variable instead of the one-period-ahead change in asset volatility, $\Delta SigA$. If a firm engages in risk-increasing activities, it will likely have volatile returns to capital (John et al. 2008). I expect that such behavior will eventually be reflected in the riskiness of the firm's equity after controlling for the proportion of debt in the capital structure. I estimate equity volatility (*SigE*) by using daily equity returns for the 252 trading days. The model below uses $\Delta SigE$ instead of $\Delta SigA$ as the dependent variable.

$$\Delta SigE_{it+1} = \beta_0 + \beta_1 \times \Delta Invest_{it} + \beta_2 \times AccQ_{it} + \beta_3 \times \Delta Invest_{it} \times AccQ_{it} + Controls_{it} + \varepsilon_{it} \quad (7)$$

All other variables are identical to those in Equation (1). The results from using this model are presented in Table XI, Panel A and are consistent with those in Table V. One noticeable difference is that adjusted R-squared for the equity-volatility model are significantly higher for the top two distressed quintiles (17.1% vs. 9.6% and 14.3% vs. 5.1% for the 4^{th} and 5^{th} quintiles, respectively). This observation is consistent with the expectation that estimated asset volatility of distressed firms may be considerably noisy.

6.2. Using an alternative measure of investment

I use an alternative proxy for investment by adding R&D to capital expenditures when calculating investment intensity (*Invest*), similar to Verdi (2006). For the purpose of this robustness test, I set all missing R&D observations (data item 46) equal to zero. All other model specifications remain the same as in Equation (1). The results from this robustness test are shown in Table XI, Panel B and are consistent with those in Table V.

6.3. Using leverage instead of distress risk

I use the degree of leverage instead of the level of distress risk to proxy for the amount of benefits risk shifting provides to shareholders (e.g., Green and Talmor, 1986). I partition the Debt Covenant Sample into leverage quintiles by year in the same way that I partition the sample into distress quintiles in the main specifications. The results of estimating Equation (1) for leverage quintiles are shown in Table XI, Panel C and are consistent with those in Table VII.

6.4. Partitioning by lease intensity

Sharpe and Nguyen (1995) note that leasing instead of buying equipment can provide creditors, i.e., lessors, with more security and higher priority in bankruptcy, thus mitigating agency problems that result from information asymmetries between the firm and capital providers. In order to rule out the possibility that higher risk shifting activities of firms with poor accounting quality are associated with their choices of leasing versus buying, I test whether the effect of asymmetric timeliness on risk shifting depends on the level of lease intensity.

The results from partitioning the Debt Covenant Sample by cross-sectional medians of lease intensity are shown in Table XI, Panel D. The β_3 coefficient is significant in both subsamples although the size of β_3 relative to that of β_1 is about two times higher for the high lease intensity subsamples (81.8% vs. 41.1%) indicating that accounting quality matters more for firms that use leases more extensively. This result is consistent with the evidence presented in Beatty et al. (2008) that firms with poor accounting quality are more likely to lease than to buy.[38]

6.5. Other robustness checks

I also subject the data to a battery of other sensitivity tests to ensure the stability of the results. I use a number of alternative measures for size, leverage, profitability, expected market volatility, and overall economy health. I also follow the procedure used by Eisdorfer (2008) and exclude firm-years with significant new issues of equity or debt (more than 5% of total assets) from the sample to address the concern that observed changes in volatility may be mechanically driven by changes in the firm capital structure unrelated to the market value of assets. The results of these tests are generally consistent with the main findings in this study.

[38] Beatty et al. (2008) are interested in a different dimension of accounting quality. Namely, they proxy for the overall accrual quality by using absolute value of current accruals.

7. Conclusion

This study examines the effect of accounting quality on risk shifting. I argue that accounting quality helps mitigate risk shifting by aiding debtholders in monitoring and disciplining firm's investment decisions. I predict that high accounting quality is associated with lower changes in asset volatility in response to new investments and interpret such evidence as an indication of lower risk shifting. I also test for whether the effect of accounting quality on risk shifting differs depending on cross-sectional and time-series characteristics. I expect that this effect will be more pronounced for firms with poor information environment, high distress risk, and operating cash flows, and for observations in the post-SOX period. I also expect that this effect will differ depending on the source of firm's debt. I use asymmetric timeliness in recognition of bad versus good news as a dimension of accounting quality that is of a first-order importance to debtholders.

The results are consistent with the expectations. Firms in the top accounting quality decile exhibit significantly less risk shifting than firms in the bottom decile. The accounting quality effects are significantly stronger for firms with poor information environment, high distress risk, and with public debt in the capital structure. While there is some evidence that accounting quality is more important in mitigating risk shifting for firm-years with high operating cash flows and after the adoption of SOX, the difference is not statistically significant at conventional confidence levels. The results are robust to using different sample modifications, alternative measures of investment and distress, and to the inclusion of various control variables.

This study contributes to the accounting literature that examines the effects of accounting quality on the severity of debt-equity agency conflicts (e.g., Biddle et al., 2008; Louis et al., 2009). The results in this study strengthen the evidence provided by Zhang (2008) that both lenders and borrowers benefit from asymmetric timeliness *ex ante*. I provide evidence suggesting that borrowers with higher asymmetric timeliness behave *ex post* in a way that lowers debt agency costs, which gives an explanation to why these borrowers are rewarded with a lower cost of debt *ex ante*. This study also contributes to the growing literature in finance that examines the role of covenants on the interaction of firms with their debt capital providers (e.g., Chava and Roberts, 2008; Roberts and Sufi, 2008; Nini et al, 2009-b) by proving evidence suggesting that accounting quality affects the efficiency of this relationship.

This study can be extended along several avenues. First, an international setting can be used to verify the claim made by Biddle and Hillary (2006) that the usefulness of accounting quality for mitigating debt-equity agency conflicts is stronger in equity-dominated economies than in debt-dominated ones. Second, the usefulness of other dimensions of accounting quality for decreasing risk shifting can be examined, such as transparency, for example. Third, researchers can examine whether accounting quality and other corporate governance mechanisms complement or substitute each other in reducing risk shifting.

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Appendix 1: Examples of Risk Shifting

Panel A – Binomial Distribution Example (Hypothetical)

Firm A (Face Value of Debt = 100)

			Market Values		
Face Value of Debt	**100**	**Prob**	**Assets**	**Debt**	**Equity**
Up State		0.5	200	100	100
Down State		0.5	100	100	0
Expected Value			150	100	50
Debt Value / Face				100.0%	
Volatility			**50**	0	50
Volatilty Increase	10%		**Market Values**		
		Prob	**Assets**	**Debt**	**Equity**
Up State		0.5	205	100	105
Down State		0.5	95	95	0
Expected Value			150	97.5	52.5
Debt Value / Face				97.5%	
Volatility			**55**	2.5	52.5
Δ Expected Value			**0.0**	**-2.5**	**2.5**
% Δ Expected Value			**0.0%**	**-2.5%**	**5.0%**

Firm B (Face Value of Debt = 150)

			Market Values		
Face Value of Debt	**150**	**Prob**	**Assets**	**Debt**	**Equity**
Up State		0.5	250	150	100
Down State		0.5	50	50	0
Expected Value			150	100	50
Debt Value / Face =				66.7%	
Volatility			**100**	50	50
Volatilty Increase	10%		**Market Values**		
		Prob	**Assets**	**Debt**	**Equity**
Up State		0.5	260	150	110
Down State		0.5	40	40	0
Expected Value			150	95	55
Debt Value / Face =				63.3%	
Volatility			**110**	55	55
Δ Expected Value			**0.0**	**-5.0**	**5.0**
% Δ Expected Value			**0.0%**	**-5.0%**	**10.0%**

Panel A presents a hypothetical example (with the binomial distribution of outcomes) of how changing the volatility of assets benefits equityholders to the detriment of debtholders. This example demonstrates that the same (proportional) increase in asset volatility causes a higher increase in equity value for shareholders of a riskier firm. This happens due to the asymmetric nature of debt payoffs that results in unequal sharing of the upside and the downside of increased risk by shareholders and debtholders.

The only two possible states of the world, the up state and the down state, are equally likely. There are two firms, Firm A and Firm B. Both firms have the same expected market value of assets, debt, and equity of 150, 100, and 50, respectively. However, Firm A is less risky than Firm B both because it has a lower volatility of its asset base (50 versus 100) and less debt (face value of 100 versus 150). At the beginning, Firm A is virtually safe because the value of its assets will be enough to repay all 100 of its debt in both states of the world. As a result, Firm A's debt is trading at 100% of its face value. Firm B, on the other hand, will not be able to repay all 150 of its debt in the down state because the value of assets in this scenario will only be 50. As a result, Firm B's debt is trading at 66.7% of its face value (= 150 x 0.5 + 50 x 0.5).

Both firms have an option to engage in new risky projects and increase the volatility of their assets by 10% (relative to their respective initial level of volatility). That is, Firm A can increase it asset volatility from 50 to 55 (= 50 x 1.1) while Firm B can increase its volatility from 100 to 110 (= 100 x 1.1). For simplicity, let us assume that new projects have symmetric payoffs in both up and down states of the world, and, as a result, will not change the expected value of assets for both firms. In other words, the effect of undertaking these additional projects will be an increase in asset volatility without any change in the expected value of assets. If we keep the probabilities of the states of the world happening the same (at 50-50) and increase the volatility by 10% while leaving the expected value of assets the same at 150, there is a unique solution to what the new value of asset will be in both states.

As can be seen in the bottom part of Panel A, an increased in asset volatility causes the debt to become more risky in both firms. Firm A now will not be able to fully repay its 100 worth of obligations in the down state since the market value of assets will only be 95. As a result, Firm A's debt is now trading at 97.5% (= 100 x 0.5 + 95 x 0.5). Firm B's debtholders also bear a loss in the value of debt since they do not benefit from the higher asset value in the up state but they do receive less in the down state (40 instead of 50). Consequently, the value of their debt claims now drop from 66.7% of the face value to 63.3% (= 150 x 0.5 + 40 x 0.5).

Since the change in the expected value of assets does not change by design, any decreases in debt value due to increased riskiness will cause the value of equity to increase. As shown at the bottom of the panel, the expected value of Firm A's debt will decrease by 2.5 (= 97.5 – 100) and the value of its equity will increase by 2.5 (= 52.5 – 50). This corresponds to a 2.5% drop in the value of debt (= 2.5 / 100) and to the 5.0% increase in the value of equity (= 2.5 / 50). The expected value of Firm B's debt will decrease by 5.0 (95 – 100) and the value of its equity will increase by 5 (55 – 50). This corresponds to a 5% drop in the value of debt (= 5 / 100) and to a 10% increase in the value of equity (= 5 / 50).

Appendix 1: Examples of Risk Shifting

Panel B – Continuous Distribution Example (Empirical)

	Debt Covenant Sample		Top Distress Quintile	
	Mean Firm	**Median Firm**	**Mean Firm**	**Median Firm**
Market Value of Assets (*Va*)	6,529	1,412	2,232	586
Total Liabilities (*TL*)	2,633	562	1,604	386
Wtd Debt Maturity (*Wtd YTM*)	3.18	3.35	3.49	3.65
Asset Return Volatility (*SigA*)	27.34%	21.76%	38.93%	32.03%
Riskless Rate (*Rf*)	3.69%	4.55%	3.69%	4.49%
Dividend Rate (*Div Rate*)	-3.14%	1.99%	-0.45%	1.36%
Market Value of Equity (*Ve*)	4,879	839	1,051	257
Option Vega	**1.98**	**0.23**	**10.08**	**2.13**
Full Sample vs. Distress Quintile			(x 5.1)	(x 9.1)
Elastisity Vega	**0.01**	**0.01**	**0.37**	**0.27**
Full Sample vs. Distress Quintile			(x 33.7)	(x 43.8)

Panel B presents an example (with a continuous distribution of outcomes) illustrating that the effect of increasing asset volatility on equity value increases in distress risk. Two pairs of firms are compared: a "Mean Firm" from the Debt Covenant Sample and the top distress quintile, and a "Median Firm" from the same samples. The mean and median firms' characteristics are the means and the medians of the corresponding samples.

The values for the market value of assets, total liabilities, weighted debt maturity, asset return volatility and the riskless rate are input into the Black-Scholes model. I calibrate the model by using the dividend rate that makes the output (market value of equity) equal to the mean (or median) market value of equity that has been estimated as described in Appendix 3. *Option Vega* is the sensitivity of the equity value to changes in asset volatility. *Elasticity Vega* is the relative sensitivity of the value of equity to changes in asset volatility. Formally,

$$Option\ Vega = \frac{\partial Ve}{\partial SigA} \text{ and } Elasticity\ Vega = \frac{\partial Ve/Ve}{\partial SigA/SigA}.$$

Option Vega = 10 means that a mean firm from the top distress quintile will experience an increase in the value of equity of $10 million for a 1% (absolute) change in asset volatility. Since the mean value of equity is $1,051 million, this increase corresponds to a 0.95% return on equity. *Elasticity Vega* = 0.37 means that a mean firm from the top distress quintile will experience a 0.37% increase in equity for a 1% (relative) change in asset volatility. Since a 1% absolute change in asset volatility corresponds to approximately a 2.6% relative change (= 1% / 39%) in equity value and thus correspond a 0.95% return on equity (= 2.6% x 0.37).

Option Vega and *Elasticity Vega* are correspondingly 5 and 34 times higher for the mean firm in the top distress quintile than for the mean firm in the Debt Covenant Sample. *Option Vega* and *Elasticity Vega* are correspondingly 9 and 44 times higher for the median firm in the top distress quintile than for the median firm in the Debt Covenant Sample.

Appendix 2: Variable Definitions

Dependent variables	
$SigA_t$	Firm-specific asset value volatility estimated using the Merton (1974) model (see Appendix 3 for details)
$\Delta SigA_{t+1}$	The change in firm-specific asset return volatility in period $t + 1$, i.e., $SigA_{t+2} - SigA_{t+1}$
$SigE_t$	Firm-specific equity value volatility estimated using prior 90 trading days
$\Delta SigE_{t+1}$	The change in firm-specific asset return volatility in period $t + 1$, i.e., $SigE_{t+2} - SigE_{t+1}$
Measures of investment and accounting quality	
$Invest_t$	Investment intensity, capital expenditures scaled by beginning PPE, i.e., Data128 / Data7
$\Delta Invest_t$	The change in $Invest_t$ in period *t*, i.e., $Invest_{t+1} - Invest_t$
$AsymTime_t$	Asymmetric timeliness measure from Khan and Watts (2009), *C_Score*
Partitioning variables	
$Bid - Ask_t$	Closing daily bid-ask spread from the daily CRSP file deflated by price, averaged over the past year
$Analyst_t$	Number of analysts following the firm, obtained from I/B/E/S
$AdjPIN\ Score_t$	Probability of informed trading score from Duarte and Young (2009)
$Distress_t$	Probability of default from the Merton (1974) model, see Appendix 3
CFO_t	Cash flow from operations scaled by beginning total assets, i.e., Data308 / Data6
$Public\ Debt_t$	A variable indicating the presence of public debt
$Syndicated\ Debt_t$	A variable indicating the presence of syndicated debt
SOX_t	A variable indicating pre- (up to 2003) and post-SOX (2003 and later) periods
$Lease_t$	Lease intensity, operating leases scaled by the sum of operating leases and capital expenditures, i.e., Data96 / (Data96 + Data128)
Debt contracting variables	
$ST\ Debt_t$	Ratio of short-term debt to total debt, i.e., Data34 / (Data9 + Data34)
$Deal\ Amount_t$	The total amount of debt in a deal (either public or syndicated)
$Outs\tan d\ Amt_t$	The total amount of debt outstanding (either public or syndicated)
YTM_t	Years-to-maturity for a debt issue (either public or syndicated)
$Weighted\ YTD_t$	Debt-book-value weighted years-to-maturity (both public and syndicated)
$Term\ Loan_t$	An indicator of the presence of a term loan (syndicated debt only)
$Deal\ Year_t$	An indicator that a debt deal originated in this year (either public or syndicated)

$Senior_t$	An indicator of whether the debt is senior (either public or syndicated)
$Secured_t$	An indicator of whether the debt is secured (either public or syndicated)
$Convertible_t$	An indicator of whether public debt is convertible
$Leveraged_t$	A indicator of whether syndicated debt is convertible
$Merger\ \mathrm{Re}strict_t$	An indicator of the presence of M&A restrictions in a debt contract (either public or syndicated)
$Asset\ Sale\ \mathrm{Re}strict_t$	A indicator of the presence of asset sale restrictions in a debt contract (either public or syndicated)
$Invest\ \mathrm{Re}strict_t$	An indicator of the presence of investment restrictions in a debt contract (either public or syndicated)
$Cross\ Default_t$	A indicator of the presence of a cross-default or a cross-accelerator provision in a debt contract (public debt only)
$Perf\ \mathrm{Pr}icing_t$	A indicator of the presence of a performance pricing provision in a debt contract (syndicated debt only)

Firm-specific control variables

$Size_t$	Natural logarithm of the market value of assets, *Va*, from the Merton model (see Appendix 3 for details)
$Leverage_t$	A measure of firms' leverage, total liabilities divided by total assets, i.e., Data181 / Data6
MB_t	Market-to-book, market value of equity divided by the book value of equity, i.e., (Data25 * Data199) / Data60
ROA_t	Ratio of net income to average total assets, i.e., Data172 / Data6
$Cash_t$	Cash and short-term investments balance scaled by beginning total assets, i.e., Data1 / Data6
$Firm\ Age_t$	Average of the number of years a firm has been in Compustat and CRSP
$Loss_t$	A variable indicating whether net income is negative, i.e., Data172 < 0
$\mathrm{Re}t_t$	Firm-specific equity return for the past 12 months estimated using monthly returns from CRSP
BVE_t	Book value of equity, i.e., Data60
$Sales_t$	Net sales, i.e., Data12
TA_t	Total assets, i.e., Data6
TL_t	Total liabilities, i.e., Data181

Period-specific control variables

$SP\ 500\ \mathrm{Re}t_t$	Return on S&P 500 over the past 12 months
$Exp\ Volatility_t$	Conditional expected market volatility, measured by applying GARCH(1,1) to monthly NYSE market index returns from 1927 to 2006
$Default\ Spread_t$	The yield spread between long-term Baa- and Aaa-rated "vanilla" bonds, obtained from the Federal Reserve Bank of St. Louis's website
$Riskless\ Rate_t$	Risk-free interest rate, nominal return on 1-month Treasure bills

Appendix 3: Estimating *SigA* and *Distress*

The estimation procedure is based on the Merton (1974) model, which views equity as a European call option on the value of the firm's assets. This structural model has been used extensively by academics (e.g., Vassalou and Xing, 2004) and practitioners (e.g., EDFs from Moody's KMV). Firm asset value is assumed to follow a stochastic lognormal process with constant volatility. Interest rates are assumed to be constant and taxes on dividends are ignored. Other standard Black-Scholes model assumptions also apply.

Variable Definitions:

V_E	current market value of common equity
$SigE$	instantaneous standard deviation of equity returns
TL	book value of total liabilities
T	time until the maturity of debt
r	continuously compounded one-year Treasury bill rate
δ	continuously compounded dividend yield
Div	the sum of common and preferred dividends
V_A	current market value of assets, calculated by solving the BSM equation
$SigA$	instantaneous standard deviation of asset returns, calculated by solving the BSM equation
μ	continuously compounded expected total return on assets, see Step 2 below for detail
$Distress$	Expected default frequency, the probability that the value of assets, V_A, will fall below the book value of total liabilities, TL, within T years.

The first six variables are either directly observable or can be estimated from observable market data. The last three variables (V_A, $SigA$, and μ) are not observable. The standard deviation of equity returns, $SigE$, is estimated using 3 prior months of continuously compounded daily stock returns from CRSP and annualized assuming 252 trading days in a year. The dividend rate, δ, is calculated as a natural logarithm of the sum of common and preferred dividends divided by the approximate market value of assets, which is defined as the market value of equity plus the book value of total liabilities.

To estimate debt maturity, T, I appeal to the findings in Barclay and Smith (1995) that show that that the average maturity of long-term debt is approximately 5 years. Assuming that the average maturity for short-term debt is 6 months, the firm's average debt maturity is estimated as follows: $\hat{T} = (0.5 \times STD + 5 \times LTD)/(STD + LTD)$ where STD and LTD are short-term debt and long-term debt, respectively. In the sensitivity analysis section, I also re-estimate the model using $T = 1$ as done in Crosbie and Bohn (2001) and Vassalou and Xing (2004).

Step 1

V_A and $SigA$ are estimated jointly by numerically solving a non-linear system of equations consisting of the Black-Scholes equation modified for dividends received by equity holders and the optimal hedge equation. The starting values are $V_A = V_E + TL$ and $SigA = SigE \times V_E \times (V_E/TL)$ The iterative process uses the Newton-Raphson search algorithm that stops when a pair of values is found such as the difference between two consecutive iterations is less than $10 \times e^{-4}$. Almost all solutions converge within few iterations.

Equation 1: the Black-Scholes-Merton (BSM) equation for the value of equity with dividends:

$$V_E = V_A \times e^{-\delta T} N(d_1) - TL \times e^{-rT} N(d_2) + V_A \times \left(1 - e^{-\delta T}\right)$$

Equation 2: the optimal hedge equation with dividends:

$$SigE = \left[e^{-\delta T} N(d_1) + \left(1 - e^{-\delta T}\right)\right] \times \frac{V_A}{V_E} \times SigA$$

$$\text{where } d_1 = \frac{\ln(V_A / TL) + \left[r - \delta + \left(SigA^2/2\right)\right]T}{SigA \times \sqrt{T}} \text{ and } d_2 = d_1 - SigA \times \sqrt{T}$$

Step 2

I estimate the rate of growth in assets, μ, using the procedure described in Campbell, Lo, and MacKinlay (1997) and the estimated values of V_A and $SigA$ from Step 1:

$$\hat{\mu} = \ln V_{A,t} + \delta - \ln V_{A,t-1} + 0.5 SigA^2$$

If $\hat{\mu}$ is less than the risk-free rate, r, in any given year, $\hat{\mu}$ is set equal to r. Although the realized rate of growth in assets can be below the risk-free rate or even negative, having the expected rate of growth less than the risk-free rate is inconsistent with conventional assets pricing theories. Also, μ is winsorized above at 99%.

Step 3

I estimate the expected probability of default (*Distress*) as a probability that the firm's asset value falls below its liabilities after T years assuming that the firm's asset value (continuous rate of growth in assets) is log-normally (normally) distributed.

$$Distress = N\left(-\frac{\ln(V_A / TL) + \left[\mu - \delta - \left(SigA^2/2\right)\right]T}{SigA \times \sqrt{T}}\right)$$

My estimation procedure is similar to that used in Hillegeist et al. (2004). There are two main differences. First, my optimal hedge equation accounts for an additional term $V_A\left(1 - e^{-\delta T}\right)$ added to the regular Black-Scholes formula to account for the fact that dividends are received by equityholders. Second, I explicitly account for the dividends in the model.

Some authors (e.g., Vassalou and Xing, 2004; Campbell et al., 2007) ignore dividends altogether. The implicit argument these papers make is that adding the discounted dividend stream to the value of equity while accounting for the dividends in the BSM formula is approximately equivalent to ignoring the dividends altogether. However, whereas it is possible to ignore dividends in the estimation of the asset value and volatility, it is necessary to include dividend yield in the probability of default (*Distress)* calculation in Step 3.

Appendix 4: Derivation of the Optimal Hedge Equation

Need to show

$$\sigma_E = [e^{-\delta T} N(d_1) + (1 - e^{-\delta T})] \times \frac{V_A}{V_E} \sigma_A$$

$$where \; d_1 = \frac{\ln(V_A / X) + [r - \delta + (\sigma_A^2 / 2)]T}{\sigma_A \sqrt{T}}$$

Proof

$$dV_A = (\mu - \delta) V_A \, dt + \sigma_A V_A \, dZ$$

$$V_E = V_A \, e^{-\delta T} N(d_1) - X e^{-rT} N(d_2) + V_A (1 - e^{-\delta T}) \Rightarrow \frac{\partial V_E}{\partial V_A} = e^{-\delta T} N(d_1) + (1 - e^{-\delta T})$$

By Ito's Lemma:

$$dV_E = \frac{\partial V_E}{\partial V_A} dV_A + \frac{\partial V_E}{\partial t} dt + \frac{1}{2} \frac{\partial^2 V_E}{\partial V_A^2} (dV_A)^2 =$$

$$\frac{\partial V_E}{\partial V_A} [(\mu - \delta) V_A \, dt + \sigma_A V_A \, dZ] + \frac{\partial V_E}{\partial t} dt + \frac{1}{2} \frac{\partial^2 V_E}{\partial V_A^2} \sigma_A^2 \, V_A^2 \, dt =$$

$$\left[\frac{\partial V_E}{\partial V_A} (\mu - \delta) V_A \, dt + \sigma_A V_A \, dZ \; V_A + \frac{\partial V_E}{\partial t} + \frac{1}{2} \frac{\partial^2 V_E}{\partial V_A^2} \sigma_A^2 V_A^2 \right] dt + \frac{\partial V_E}{\partial V_A} \sigma_A V_A \, dZ \Rightarrow$$

$$\frac{dV_E}{V_E} = \frac{1}{V_E} \left[\frac{\partial V_E}{\partial V_A} (\mu - \delta) V_A + \frac{\partial V_E}{\partial t} + \frac{1}{2} \frac{\partial^2 V_E}{\partial V_A^2} \sigma_A^2 V_A^2 \right] dt + \frac{\partial V_E}{\partial V_A} \frac{V_A}{V_E} \sigma_A \, dZ = \alpha \, dt + \frac{\partial V_E}{\partial V_A} \frac{V_A}{V_E} \sigma_A \, dZ \Rightarrow$$

$$\sigma_E = \frac{\partial V_E}{\partial V_A} \frac{V_A}{V_E} \sigma_A = [e^{-\delta T} N(d_1) + (1 - e^{-\delta T})] \times \frac{V_A}{V_E} \sigma_A$$

Q.E.D.

Figure 1 – Distress Risk Regions

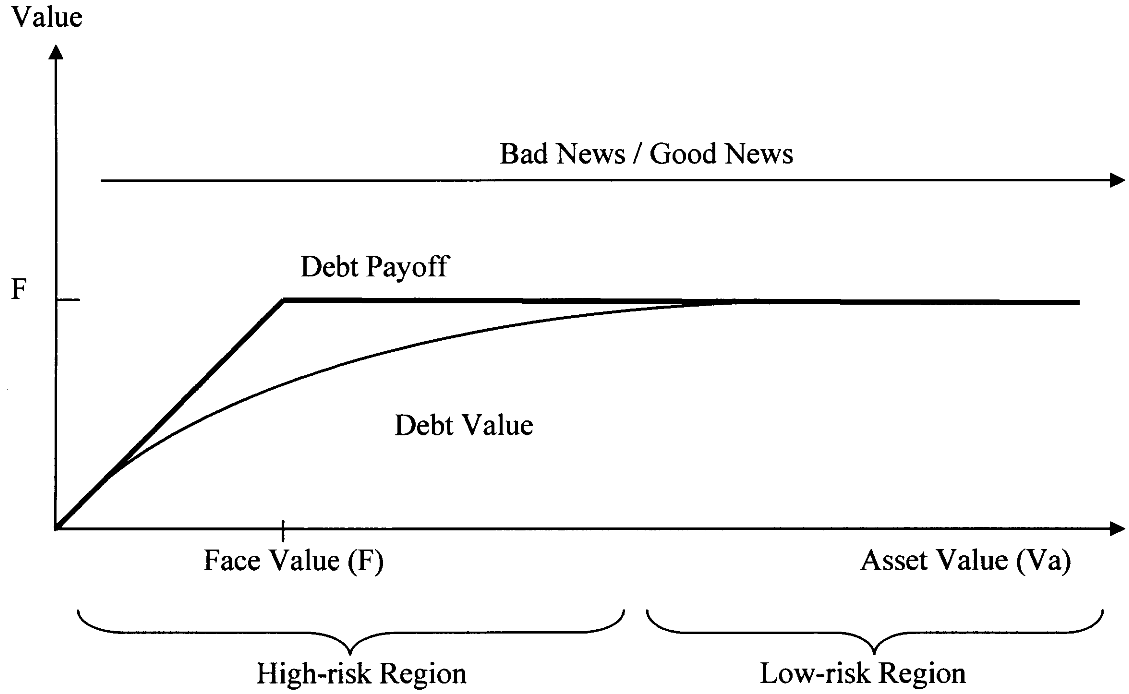

Figure 2 – Measurement Timeline

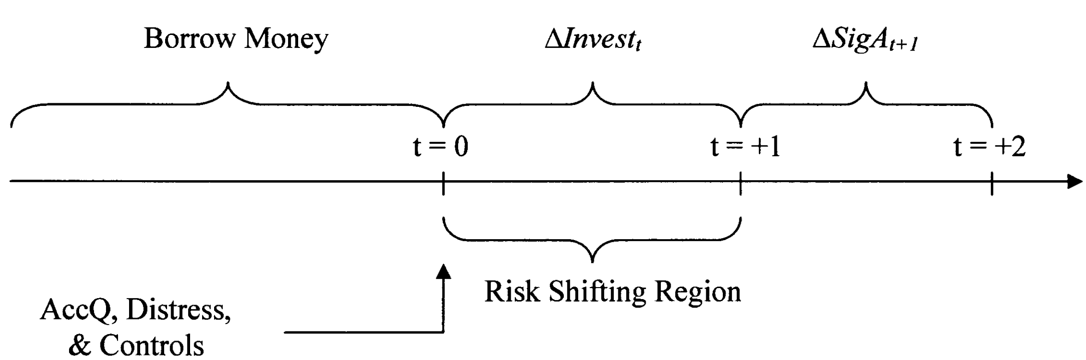

Table I – Panel A

Sample Selection

Table I, Panel A presents sample selection frequency statistics for four different samples. The initial Public Debt Sample consists of all public dollar-denominated debt issuances by U.S.-based non-financial firms from January 1995 to December 2005 for which covenant data is available in the FISD database. The initial Syndicated Loan Sample consists of all syndicated dollar-denominated loan issuances by U.S.-based non-financial firms from January 1995 to December 2005 for which covenant data is available in the SDC database. The initial Debt Covenant Sample consists of all observations that belong to either the Public Debt Sample or to the Syndicated Loan Sample. The "Covenant Data Available" line shows the statistics for these three initial samples. The "Merge to Compustat" line presents the statistics for the three samples after keeping only the observations that have valid Compustat identifiers (*Gvkey*) and after aggregating all observations to the firm-year level by adding all outstanding amounts according to corresponding maturities. The "Have Non-Missing Data" line shows the statistics for the three samples after keeping only those observations for which all the main variables used in the paper are available. The Compustat Sample includes all observation with fiscal year-end between 1995 and 2006, subject to having non-missing cash, net income, and operating cash flow as well as positive total assets in the current and the previous years, total liabilities, net sales, common share price, common shares outstanding, and book value of equity.

Panel A: Observation Frequency

	Issues	Firms	Firm-years
Public Debt Sample			
Covenant Data Available	8,800	3,416	
Merge to Compustat	5,761	2,034	12,489
Have Non-Missing Data	3,754	1,291	6,625
Syndicated Loan Sample			
Covenant Data Available	8,099	4,411	
Merge to Compustat	5,511	2,638	12,788
Have Non-Missing Data	3,926	1,861	7,897
Debt Covenant Sample			
Covenant Data Available	16,899	6,492	
Merge to Compustat	11,272	3,573	20,274
Have Non-Missing Data	7,680	2,344	11,238
Compustat Sample			
Have Non-Missing Data		9,048	54,388

Table I – Panel B

Descriptive Statistics

Table I, Panel B presents descriptive statistics for the Public Debt Sample and the Syndicated Loan Sample. The initial Public Debt Sample consists of all public dollar-denominated debt issuances by U.S.-based non-financial firms from January 1995 to December 2005 for which covenant data is available in the FISD database. The initial Syndicated Loan Sample consists of all syndicated dollar-denominated loan issuances by U.S.-based non-financial firms from January 1995 to December 2005 for which covenant data is available in the SDC database. All variables used below are described in detail in Appendix 2.

Panel B: Public Debt and Syndicated Loan Samples - Covenant Data Available

	Public Debt Sample (8,800 issues from 3,416 firms)					Syndicated Loan Sample (8,099 issues from 4,411 firms)				
	Mean	Median	Std	Q1	Q3	Mean	Median	Std	Q1	Q3
Deal Amount (*Deal Amount*) - $ million	300	200	323	125	350	368	150	758	62	375
Years to Maturity (*YTM*)	11.8	9.7	10.0	6.7	10.1	4.1	4.1	2.1	2.9	5.0
Term Loan Indicator (*Term Loan*)						0.23	0.00	0.42	0.00	0.00
Senior Debt (*Senior*)	0.95	1.00	0.22	1.00	1.00	1.00	1.00	0.06	1.00	1.00
Secured Debt (*Secured*)	0.30	0.00	0.46	0.00	1.00	0.57	1.00	0.50	0.00	1.00
Convertible Debt (*Convertible*)	0.13	0.00	0.34	0.00	0.00					
Leveraged Loan (*Leveraged*)						0.55	1.00	0.50	0.00	1.00
Merger Restrictions (*Merger*)	0.93	1.00	0.25	1.00	1.00	0.51	1.00	0.50	0.00	1.00
Asset_Sale Restrictions (*Asset Sale Restr*)	0.94	1.00	0.25	1.00	1.00	0.49	0.00	0.50	0.00	1.00
Investment Restrictions (*Invest Restr*)	0.03	0.00	0.16	0.00	0.00	0.39	0.00	0.49	0.00	1.00
Cross-Default Provision (*Cross Default*)	0.64	1.00	0.48	0.00	1.00					
Performance Pricing Features (*Perf Pricing*)						0.79	1.00	0.40	1.00	1.00

Table I – Panel C

Descriptive Statistics

Table I, Panel C presents descriptive statistics for the Public Debt Sample and the Syndicated Loan Sample after keeping only those observations for which valid Compustat identifiers (*Gvkeys*) are available and after aggregating all observations to the firm-year level by adding all outstanding amounts according to corresponding maturities. The initial Public Debt Sample consists of all public dollar-denominated debt issuances by U.S.-based non-financial firms from January 1995 to December 2005 for which covenant data is available in the FISD database. The initial Syndicated Loan Sample consists of all syndicated dollar-denominated loan issuances by U.S.-based non-financial firms from January 1995 to December 2005 for which covenant data is available in the SDC database. All variables used below are described in detail in Appendix 2.

Panel C: Public Debt and Syndicated Loan Samples - Merge to Compustat

	Public Debt Sample (12,489 firm-years, 2,034 firms)					Syndicated Loan Sample (12,788 firm-years, 2,638 firms)				
	Mean	Median	Std	Q1	Q3	Mean	Median	Std	Q1	Q3
Outstanding Amount (*Outstand Amt*) - $ million	683	260	1,261	125	645	599	220	1,331	80	580
Weighted Years-to-Maturity (*Wtd YTM*)	8.6	6.7	7.2	4.4	9.6	2.7	2.5	1.8	1.3	3.8
Deal Origination Year (*Deal Year*)	0.28	0.00	0.45	0.00	1.00	0.33	0.00	0.47	0.00	1.00
Senior Debt (*Senior*)	0.98	1.00	0.15	1.00	1.00	1.00	1.00	0.05	1.00	1.00
Secured Debt (*Secured*)	0.46	0.00	0.50	0.00	1.00	0.60	1.00	0.49	0.00	1.00
Convertible Debt (*Convertible*)	0.25	0.00	0.43	0.00	0.00					
Leveraged Loan (*Leveraged*)						0.54	1.00	0.50	0.00	1.00
Merger Restrictions (*Merger*)	0.96	1.00	0.20	1.00	1.00	0.55	1.00	0.50	0.00	1.00
Asset_Sale Restrictions (*Asset Sale Restr*)	0.96	1.00	0.20	1.00	1.00	0.54	1.00	0.50	0.00	1.00
Investment Restrictions (*Invest Restr*)	0.04	0.00	0.18	0.00	0.00	0.41	0.00	0.49	0.00	1.00
Cross-Default Provision (*Cross Default*)	0.80	1.00	0.40	1.00	1.00					
Performance Pricing Features (*Perf Pricing*)						0.82	1.00	0.38	1.00	1.00

Table II – Panel A & B

Sample Composition

Table II, Panel A presents observation frequency for each fiscal year. Panel B presents observation frequency for each industry according to the Fama-French 12-industry classification. The Debt Covenant Sample consists of all observations from 1995 to 2006 that belong to either the Public Debt Sample or the Syndicated Loan Sample that have non-missing values for all the main variables used in the paper. The Compustat Sample comprises all observation with fiscal year-end between 1995 and 2006, subject to having non-missing cash, net income, and operating cash flow as well as positive total assets in the current and the previous years, total liabilities, net sales, common share price, common shares outstanding, and book value of equity.

Panel A: Observations Frequency by Year

	Debt Covenant Sample		Compustat Sample	
Year	Frequency	Percent	Frequency	Percent
1995	285	2.5%	4,654	8.6%
1996	611	5.4%	5,028	9.2%
1997	855	7.6%	5,394	9.9%
1998	1,018	9.1%	5,243	9.6%
1999	1,090	9.7%	4,998	9.2%
2000	1,078	9.6%	4,896	9.0%
2001	1,041	9.3%	4,654	8.6%
2002	1,051	9.4%	4,284	7.9%
2003	1,091	9.7%	4,080	7.5%
2004	1,134	10.1%	3,900	7.2%
2005	1,064	9.5%	3,788	7.0%
2006	920	8.2%	3,469	6.4%
Total	11,238	100.0%	54,388	100.0%

Panel B: Observation Frequency by Industry

	Debt Covenant Sample		Compustat Sample	
Industry	Frequency	Percent	Frequency	Percent
Consumer Nondurables	836	7.4%	3,723	6.8%
Consumer Durables	421	3.7%	1,632	3.0%
Manufacturing	1,832	16.3%	6,878	12.6%
Energy	762	6.8%	2,337	4.3%
Chemicals	450	4.0%	1,387	2.6%
Business Equipment	1,588	14.1%	13,050	24.0%
Telecommunications	516	4.6%	1,620	3.0%
Utilities	573	5.1%	1,730	3.2%
Wholesale & Retail	1,710	15.2%	6,971	12.8%
Healthcare	1,021	9.1%	6,563	12.1%
Other Industries	1,529	13.6%	8,497	15.6%
Total	11,238	100.00%	54,388	100.00%

Table III – Panels A

Descriptive Statistics

Table III, Panel A presents descriptive statistics for the Debt Covenant Sample and for the Compustat Sample. The Debt Covenant Sample consists of all observations that belong to either the Public Debt Sample or the Syndicated Loan Sample that have non-missing values for all the main variables used in the paper. The Compustat Sample comprises all observation with fiscal year-end between 1995 and 2006, subject to having non-missing cash, net income, and operating cash flow as well as positive total assets in the current and the previous years, total liabilities, net sales, common share price, common shares outstanding, and book value of equity. All variables used below are described in detail in Appendix 2.

Panel A: Debt Covenant Sample vs. Compustats Samples

	Debt Covenant Sample (11,238 firm-years, 2,344 firms)					Compustat Sample (54,388 firm-years, 9,048 firms)				
	Mean	**Median**	**Std**	**Q1**	**Q3**	**Mean**	**Median**	**Std**	**Q1**	**Q3**
Market Value of Equity (Ve) - $ million	4,879	839	15,942	225	3,000	2,145	134	14,878	28	698
Total Assets (*TA*) - $ million	4,099	971	10,277	356	3,119	1,851	135	12,254	31	655
Total Liabilities (*TL*) - $ million	2,633	562	6,508	202	1,920	1,203	51	9,927	10	337
Total Sales (*Sales*) - $ million	3,738	907	10,811	312	2,892	1,507	132	7,669	27	635
Operating Cash Flow (*CFO*)	0.09	0.09	0.12	0.04	0.15	0.03	0.07	0.22	-0.02	0.14
Return on Assets (*ROA*)	0.02	0.04	0.13	0.00	0.08	-0.05	0.03	0.27	-0.08	0.08
Loss Indicator (*Loss*)	0.25	0.00	0.43	0.00	1.00	0.38	0.00	0.48	0.00	1.00
Firm Age (*Firm Age*)	20.3	16.3	13.0	8.7	32.0	17.5	12.0	13.4	8.0	24.0
Market-to-book (*MB*)	2.68	1.98	3.75	1.24	3.19	3.31	2.00	4.32	1.18	3.58
Leverage (*Leverage*)	0.61	0.61	0.21	0.48	0.73	0.48	0.48	0.23	0.29	0.65
Cash Balance (*Cash*)	0.11	0.04	0.19	0.01	0.12	0.22	0.09	0.31	0.02	0.30

Table III – Panel B

Descriptive Statistics

Table III, Panel B presents descriptive statistics for the Debt Covenant Sample. The Debt Covenant Sample consists of all observations that belong to either the Public Debt Sample or the Syndicated Loan Sample that have non-missing values for all the main variables used in the paper. All variables used below are described in detail in Appendix 2.

Panel B: Debt Covenant Sample (11,238 firm-years, 2,344 firms)

	Mean	Median	Std	Q1	Q3
Market Value of Assets (*Va*) - $ million	6,529	1,412	15,150	454	4,964
Market Value of Equity (*Ve*) - $ million	4,879	839	15,942	225	3,000
Total Sales (*Sales*) - $ million	3,738	907	10,811	312	2,892
Total Assets (*TA*) - $ million	4,099	971	10,277	356	3,119
Total Liabilities (*TL*) - $ million	2,633	562	6,508	202	1,920
Book Value of Equity (*BVE*) - $ million	1,466	371	4,270	115	1,138
Market-to-book (*MB*)	2.68	1.98	3.75	1.24	3.19
Leverage (*Leverage*)	0.61	0.61	0.21	0.48	0.73
Short-term Debt (*ST Debt*)	0.16	0.06	0.24	0.01	0.20
Cash Balance (*Cash*)	0.11	0.04	0.19	0.01	0.12
Probability of Default (*Distress*)	0.07	0.00	0.17	0.00	0.04
Weighted Debt Maturity (*Wtd YTM*)	3.18	3.35	1.00	2.59	3.96
Asset Return Volatility (*SigA*)	0.27	0.22	0.20	0.14	0.34
Equity Return Volatility (*SigE*)	0.45	0.39	0.25	0.26	0.56
Prior 12-month Stock Return (*Ret*)	0.18	0.08	0.73	-0.19	0.37
Operating Cash Flow (*CFO*)	0.09	0.09	0.12	0.04	0.15
Return on Assets (*ROA*)	0.02	0.04	0.13	0.00	0.08
Loss Indicator (*Loss*)	0.25	0.00	0.43	0.00	1.00
Investment Intensity (*Invest*)	0.14	0.10	0.14	0.06	0.17
Asymmetric Timeliness (*AsymTime)*	0.14	0.12	0.10	0.07	0.20
Asymmetric Timeliness *(Basu*)	0.33	0.30	0.22	0.18	0.44
Firm Age (*Firm Age*)	20.3	16.3	13.0	8.7	32.0
Analyst Following (*Analyst*)	8.34	6.42	7.25	2.67	12.25
Bid-Ask Spread (*Bid-Ask*)	0.02	0.01	0.02	0.00	0.02
Lease Intensity (*Lease*)	0.38	0.09	0.80	0.02	0.32
Public Debt Outstanding (*Public*)	0.59	1.00	0.49	0.00	1.00
Syndicated Loan Outstanding (*Synd*)	0.70	1.00	0.46	0.00	1.00
Deal Origination Year (*Pub Deal*)	0.17	0.00	0.38	0.00	0.00
Deal Origination Year (*Synd Deal*)	0.22	0.00	0.42	0.00	0.00
Senior Debt (*Senior*)	0.99	1.00	0.11	1.00	1.00
Secured Debt (*Secured*)	0.54	1.00	0.50	0.00	1.00
Convertible Debt (*Convertible*)	0.21	0.00	0.41	0.00	0.00
Merger Restrictions (*Merger*)	0.78	1.00	0.41	1.00	1.00
Asset Sale Restrictions (*Asset Sale Restr*)	0.78	1.00	0.42	1.00	1.00
Investment Restrictions (*Invest Restr*)	0.26	0.00	0.44	0.00	1.00
Cross-Default Provision (*Cross Default*)	0.44	0.00	0.50	0.00	1.00
Performance Pricing (*Perform Pricing*)	0.59	1.00	0.49	0.00	1.00

Table III – Panel C

Descriptive Statistics

Table III, Panel C presents descriptive statistics for the top distress quintile, which consists of 20% of observations from the Debt Covenant Sample with the highest value of *Distress* in each fiscal year. The Debt Covenant Sample consists of all observations that belong to either the Public Debt Sample or the Syndicated Loan Sample that have non-missing values for all the main variables used in the paper. All variables used below are described in detail in Appendix 2.

Panel C: Top Distress Quintile (2,246 firm-years, 1,183 firms)

	Mean	Median	Std	Q1	Q3
Market Value of Assets (*Va*) - $ million	2,232	586	5,841	213	1,640
Market Value of Equity (*Ve*) - $ million	1,051	257	3,252	71	795
Total Sales (*Sales*) - $ million	1,829	517	4,721	195	1,406
Total Assets (*TA*) - $ million	2,145	603	6,007	235	1,513
Total Liabilities (*TL*) - $ million	1,604	386	4,579	161	1,020
Book Value of Equity (*BVE*) - $ million	542	162	1,846	43	444
Market-to-book (*MB*)	1.48	1.17	3.38	0.64	2.03
Leverage (*Leverage*)	0.71	0.68	0.23	0.55	0.83
Short-term Debt (*ST Debt*)	0.11	0.03	0.19	0.00	0.12
Cash Balance (*Cash*)	0.11	0.04	0.18	0.01	0.13
Probability of Default (*Distress*)	0.30	0.25	0.25	0.08	0.46
Weighted Debt Maturity (*Wtd YTM*)	3.5	3.6	0.9	3.0	4.1
Asset Return Volatility (*SigA*)	0.39	0.32	0.27	0.19	0.51
Equity Return Volatility (*SigE*)	0.70	0.65	0.29	0.49	0.85
Prior 12-month Stock Return (*Ret*)	-0.22	-0.30	0.59	-0.53	-0.05
Operating Cash Flow (*CFO*)	0.04	0.05	0.12	0.00	0.09
Return on Assets (*ROA*)	-0.05	-0.01	0.15	-0.09	0.03
Loss Indicator (*Loss*)	0.55	1.00	0.50	0.00	1.00
Investment Intensity (*Invest*)	0.14	0.09	0.16	0.05	0.16
Asymmetric Timeliness (*AsymTime)*	0.13	0.10	0.10	0.06	0.17
Asymmetric Timeliness *(Basu*)	0.32	0.29	0.20	0.18	0.42
Firm Age (*Firm Age*)	16.2	11.7	11.6	7.1	23.0
Analyst Following (*Analyst*)	6.31	4.58	6.06	1.75	9.33
Bid-Ask Spread (*Bid-Ask*)	0.03	0.02	0.03	0.00	0.03
Lease Intensity (*Lease*)	0.26	0.07	0.64	0.02	0.20
Public Debt Outstanding (*Public*)	0.63	1.00	0.48	0.00	1.00
Syndicated Loan Outstanding (*Synd*)	0.67	1.00	0.47	0.00	1.00
Deal Origination Year (*Pub Deal*)	0.15	0.00	0.35	0.00	0.00
Deal Origination Year (*Synd Deal*)	0.20	0.00	0.40	0.00	0.00
Senior Debt (*Senior*)	0.97	1.00	0.16	1.00	1.00
Secured Debt (*Secured*)	0.69	1.00	0.46	0.00	1.00
Convertible Debt (*Convertible*)	0.30	0.00	0.46	0.00	1.00
Merger Restrictions (*Merger*)	0.79	1.00	0.40	1.00	1.00
Asset Sale Restrictions (*Asset Sale Restr*)	0.79	1.00	0.40	1.00	1.00
Investment Restrictions (*Invest Restr*)	0.35	0.00	0.48	0.00	1.00
Cross-Default Provision (*Cross Default*)	0.51	1.00	0.50	0.00	1.00
Performance Pricing (*Perform Pricing*)	0.54	1.00	0.50	0.00	1.00

Table IV

Correlation Tables

Table IV presents pairwise correlations among the measures of asset volatility, investment intensity, distress, accounting quality, and firm-specific controls for the Debt Covenant Sample (Panel A) as well as for the top distress quintile (Panel B). The upper right-hand portion of each panel displays the Pearson product-moment correlations, and the lower left-hand portion displays the Spearman rank-order correlations. Bolded coefficients indicate statistical significance at the 5% level or better. All variables in this table are defined in Appendix 2.

Panel A: Debt Covenant Sample

	Pearson Correlation									
Spearman Correlation	*ΔSigA*	*ΔInvest*	*Distress*	*AsymTime*	Size	Leverage	MB	ROA	Cash	Firm Age
ΔSigA		**0.026**	**0.280**	**0.040**	**-0.028**	-0.011	**0.041**	**0.044**	**-0.034**	**0.027**
ΔInvest	**0.025**		**-0.094**	**0.047**	**0.068**	**-0.022**	0.006	**0.081**	**-0.046**	**0.110**
Distress	**0.230**	**-0.060**		**-0.061**	**-0.270**	**0.265**	**-0.175**	**-0.334**	**-0.024**	**-0.171**
AsymTime	**0.049**	**0.048**	**-0.070**		**0.040**	**0.085**	**-0.061**	**0.096**	**-0.220**	**0.151**
Size	-0.010	**0.061**	**-0.354**	0.017		**0.038**	**0.242**	**0.251**	**0.029**	**0.441**
Leverage	-0.006	-0.013	**0.198**	**0.103**	**0.061**		**-0.054**	**-0.320**	**-0.131**	**0.040**
MB	**0.057**	**0.060**	**-0.422**	**-0.114**	**0.421**	**-0.077**		**0.143**	**0.187**	**0.050**
ROA	**0.060**	**0.108**	**-0.436**	**0.068**	**0.277**	**-0.351**	**0.422**		**-0.167**	**0.175**
Cash	**-0.061**	-0.011	**-0.101**	**-0.260**	**0.080**	**-0.221**	**0.228**	**0.079**		**-0.151**
Firm Age	**0.033**	**0.102**	**-0.187**	**0.127**	**0.420**	**0.068**	**0.101**	**0.162**	**-0.050**	

Panel B: Top Distress Quintile

	Pearson Correlation									
Spearman Correlation	*ΔSigA*	*ΔInvest*	*Distress*	*AsymTime*	Size	Leverage	MB	ROA	Cash	Firm Age
ΔSigA		**0.030**	**0.335**	**0.055**	**-0.083**	-0.010	0.007	**0.041**	**-0.063**	-0.010
ΔInvest	**0.011**		**-0.117**	**0.050**	**0.069**	**-0.056**	**0.041**	**0.087**	-0.025	**0.111**
Distress	**0.306**	**-0.096**		**-0.040**	**-0.225**	**0.260**	**-0.145**	**-0.274**	**-0.066**	**-0.158**
AsymTime	**0.077**	0.031	-0.028		0.004	**0.076**	**-0.057**	**0.116**	**-0.266**	**0.120**
Size	**-0.079**	**0.061**	**-0.253**	-0.039		0.038	**0.072**	**0.193**	**0.102**	**0.327**
Leverage	**-0.041**	**-0.051**	**0.257**	**0.100**	0.027		**-0.144**	**-0.304**	**-0.106**	-0.007
MB	0.024	**0.079**	**-0.338**	**-0.150**	**0.242**	**-0.146**		**0.106**	**0.116**	0.020
ROA	**0.074**	**0.097**	**-0.347**	**0.123**	**0.218**	**-0.271**	**0.201**		**-0.176**	**0.170**
Cash	**-0.081**	0.008	**-0.087**	**-0.359**	**0.166**	**-0.132**	**0.240**	**-0.098**		**-0.117**
Firm Age	-0.001	**0.115**	**-0.194**	**0.078**	**0.290**	0.023	0.029	**0.159**	-0.036	

Table V

Risk Shifting in Debt Covenant Sample

Table V presents the OLS estimates of the parameters in Equation (1) for the Debt Covenant Sample containing 11,238 firm-year observations. All regressions are clustered by year and include firm fixed effects. All variables are defined in Appendix 2. Bolded coefficients indicate statistical significance at the 5% level (for a two-tailed test). The coefficients with an asterisk are significant at the 10% level.

$$\Delta SigA_{it+1} = \beta_0 + \beta_1 \times \Delta Invest_{it} + \beta_2 \times AsymTime_{it} + \beta_3 \times \Delta Invest_{it} \times AsymTime_{it} + Controls_{it} + \varepsilon_{it}$$

Equation (1) Estimated within the Debt Covenant Sample

	(1)		(2)		(3)		(4)		(5)		(6)	
	Coef	T-stat	Coef	T-stat	Coef	T-stat	Coef	T-stat	Coef	T-stat	Coef	T-stat
ΔInvest (β_1)	17.08	(5.79)	17.86	(3.97)	17.00	(4.95)	16.34	(5.34)	16.47	(5.30)	16.73	(3.40)
AsymTime x *ΔInvest* (β_3)	-10.33	(-3.71)	-10.30	(-3.70)	-10.32	(-3.68)	-9.90	(-3.50)	-10.52	(-3.74)	-10.13	(-3.52)
AsymTime	1.28	(2.37)	1.29	(2.38)	1.30	(2.39)	1.28	(2.37)	1.30	(2.39)	1.30	(2.40)
ST Debt x *ΔInvest*			-1.27	(-0.24)							-1.34	(-0.25)
ST Debt			-0.44	(-0.45)							-0.43	(-0.44)
Secured x *ΔInvest*					0.09	(0.04)					-0.34	(-0.16)
Secured					0.20	(0.57)					0.03	(0.07)
Asset Sale Restr x *ΔInvest*							1.92	(0.92)			1.97	(0.93)
Asset Sale Restr							0.36	(0.79)			0.33	(0.71)
Invest Restr x *ΔInvest*									1.34	(0.64)	1.52	(0.72)
Invest Restr									0.89	(2.20)	0.88	(2.11)
Size	-0.44	(-3.92)	-0.44	(-3.92)	-0.43	(-3.71)	-0.46	(-3.98)	-0.39	(-3.32)	-0.40	(-3.33)
Leverage	-0.64	(-0.70)	-0.59	(-0.64)	-0.68	(-0.74)	-0.69	(-0.75)	-0.83	(-0.90)	-0.82	(-0.89)
MB	0.22	(4.71)	0.22	(4.72)	0.22	(4.72)	0.22	(4.73)	0.22	(4.71)	0.22	(4.73)
ROA	4.03	(2.70)	3.99	(2.67)	4.03	(2.70)	4.03	(2.70)	3.86	(2.58)	3.83	(2.56)
Cash	-0.74	(-0.77)	-0.76	(-0.79)	-0.77	(-0.80)	-0.77	(-0.80)	-0.51	(-0.52)	-0.56	(-0.57)
Firm Age	0.06	(4.30)	0.06	(4.31)	0.06	(4.34)	0.06	(4.31)	0.07	(4.54)	0.07	(4.53)
S&P 500 Ret	-0.24	(-0.12)	-0.24	(-0.12)	-0.25	(-0.12)	-0.23	(-0.11)	-0.19	(-0.09)	-0.19	(-0.09)
Exp Volatility	1.49	(3.34)	1.50	(3.34)	1.49	(3.33)	1.50	(3.35)	1.50	(3.36)	1.51	(3.37)
Riskless Rate	2.84	(8.27)	2.84	(8.27)	2.84	(8.27)	2.84	(8.28)	2.85	(8.31)	2.85	(8.31)
Default Spread	10.28	(5.20)	10.29	(5.20)	10.28	(5.20)	10.26	(5.19)	10.31	(5.22)	10.31	(5.21)
Adj. R-squared	5.0%		5.0%		5.0%		5.0%		5.0%		5.0%	
Observations	11,238		11,238		11,238		11,238		11,238		11,238	

Table VI – Panel A

Partitioning by Information Asymmetry

Table VI, Panel A presents OLS estimates of the parameters in Equation (1) for the Debt Covenant Sample partitioned by whether a firm's average bid-ask spread over the past year is less or more than its cross-sectional median. All regressions are clustered by year and include firm fixed effects. All variables are defined in Appendix 2. Bolded coefficients indicate statistical significance at the 5% level (for a two-tailed test). The coefficients with an asterisk are significant at the 10% level. *p<1%*, p<*5%*, and p<*10%* refer to the test of the difference in the coefficients between the columns at the 1%, 5%, and 10% level, respectively.

$$\Delta SigA_{it+1} = \beta_0 + \beta_1 \times \Delta Invest_{it} + \beta_2 \times AsymTime_{it} + \beta_3 \times \Delta Invest_{it} \times AsymTime_{it} + Controls_{it} + \varepsilon_{it}$$

Panel A: Partitioning by the Cross-Sectional Median of *Bid-Ask Spread*

	Low *Bid-Ask*			Hi *Bid-Ask*	
	Coef	T-stat		Coef	T-stat
ΔInvest (β₁)	6.86	*(1.09)*	*p>10%*	**18.22**	***(2.40)***
ΔInvest x AsymTime (β₃)	4.41	*(1.16)*	***p<1%***	**-12.23**	***(-2.71)***
AsymTime	**1.83**	***(2.81)***		0.69	*(0.83)*
ΔInvest x ST Debt	-1.22	*(-0.18)*		-2.65	*(-0.33)*
ST Debt	-0.65	*(-0.54)*		-0.15	*(-0.10)*
ΔInvest x Secured	2.68	*(0.94)*		0.09	*(0.03)*
Secured	-0.12	*(-0.25)*		0.16	*(0.28)*
ΔInvest x Asset Sale Restr	5.34 *	*(1.77)*		2.54	*(0.85)*
Asset Sale Restr	0.28	*(0.48)*		0.23	*(0.34)*
ΔInvest x Invest Restr	-0.03	*(-0.01)*		2.84	*(0.89)*
Invest Restr	0.63	*(1.04)*		1.00 *	*(1.73)*
Size	0.02	*(0.10)*		**-0.76**	***(-3.66)***
Leverage	-0.25	*(-0.19)*		-1.70	*(-1.23)*
MB	**0.17**	***(3.21)***		**0.26**	***(3.10)***
ROA	**5.55**	***(2.82)***		2.85	*(1.27)*
Cash	0.39	*(0.36)*		-2.07	*(-1.13)*
Firm Age	**0.05**	***(2.82)***		**0.08**	***(3.35)***
S&P 500 Ret	-2.26	*(-1.54)*		**3.58**	***(1.97)***
Exp Volatility	**1.17**	***(5.06)***		0.40	*(1.40)*
Riskless Rate	**2.35**	***(16.38)***		**1.65**	***(8.90)***
Default Spread	-0.63	*(-0.41)*		**10.46**	***(5.32)***
Adj. R-squared	8.8%			2.9%	
Observations	5,622			5,616	

Table VI – Panel B

Partitioning by Information Asymmetry

Table VI, Panel B presents OLS estimates of the parameters in Equation (1) for the Debt Covenant Sample partitioned by whether the average number of analysts following a firm is less or more than its cross-sectional median. All regressions are clustered by year and include firm fixed effects. All variables are defined in Appendix 2. Bolded coefficients indicate statistical significance at the 5% level (for a two-tailed test). The coefficients with an asterisk are significant at the 10% level. *p<1%*, p<*5%*, and p<*10%* refer to the test of the difference in the coefficients between the columns at the 1%, 5%, and 10% level, respectively.

$$\Delta SigA_{it+1} = \beta_0 + \beta_1 \times \Delta Invest_{it} + \beta_2 \times AsymTime_{it} + \beta_3 \times \Delta Invest_{it} \times AsymTime_{it} + Controls_{it} + \varepsilon_{it}$$

Panel B: Partitioning by the Cross-Sectional Median of *Analyst Following*

	Low *Analyst*			High *Analyst*	
	Coef	T-stat		Coef	T-stat
ΔInvest (β_1)	10.96	*(1.33)*	*p>10%*	**17.03**	***(2.92)***
ΔInvest x AsymTime (β_3)	**-11.75**	***(-2.40)***	***p<5%***	0.90	*(0.25)*
AsymTime	0.26	*(0.32)*		0.71	*(1.09)*
ΔInvest x ST Debt	3.62	*(0.45)*		-14.21 *	*(-1.85)*
ST Debt	-0.03	*(-0.02)*		-1.15	*(-0.92)*
ΔInvest x Secured	-0.83	*(-0.25)*		2.45	*(0.91)*
Secured	0.37	*(0.64)*		-0.33	*(-0.71)*
ΔInvest x Asset Sale Restr	1.47	*(0.49)*		**6.73**	***(2.17)***
Asset Sale Restr	0.53	*(0.79)*		-0.01	*(-0.02)*
ΔInvest x Invest Restr	5.06	*(1.57)*		-2.72	*(-0.98)*
Invest Restr	0.80	*(1.39)*		0.92	*(1.47)*
Size	**-0.77**	***(-3.21)***		0.04	*(0.22)*
Leverage	-1.71	*(-1.22)*		0.49	*(0.40)*
MB	**0.29**	***(3.61)***		**0.14**	***(2.68)***
ROA	**6.06**	***(2.74)***		1.64	*(0.82)*
Cash	-2.71 *	*(-1.65)*		0.87	*(0.78)*
Firm Age	**0.08**	***(3.41)***		**0.05**	***(2.71)***
S&P 500 Ret	2.85	*(1.55)*		-1.19	*(-0.83)*
Exp Volatility	0.17	*(0.58)*		**1.38**	***(6.10)***
Riskless Rate	**1.75**	***(9.42)***		**2.25**	***(15.73)***
Default Spread	**8.69**	***(4.46)***		0.68	*(0.44)*
Adj. R-squared	3.0%			8.0%	
Observations	5,639			5,599	

Table VI – Panel C

Partitioning by Information Asymmetry

Table VI, Panel C presents OLS estimates of the parameters in Equation (1) for the Debt Covenant Sample partitioned by whether a firm has a debt rating from Moody's or S&P. All regressions are clustered by year and include firm fixed effects. All variables are defined in Appendix 2. Bolded coefficients indicate statistical significance at the 5% level (for a two-tailed test). The coefficients with an asterisk are significant at the 10% level. *p<1%*, p<5%, and p<*10%* refer to the test of the difference in the coefficients between the columns at the 1%, 5%, and 10% level, respectively.

$$\Delta SigA_{it+1} = \beta_0 + \beta_1 \times \Delta Invest_{it} + \beta_2 \times AsymTime_{it} + \beta_3 \times \Delta Invest_{it} \times AsymTime_{it} + Controls_{it} + \varepsilon_{it}$$

Panel C: Partitioning by the Cross-Sectional Median of *AdjPIN Score*

	Low *PIN Score*			High *PIN Score*	
	Coef	T-stat		Coef	T-stat
ΔInvest (β 1)	**24.58**	***(2.01)***	*p>10%*	**47.19**	***(3.86)***
ΔInvest* x *AsymTime (β 3)	8.89	*(1.55)*	***p<1%***	**-25.43**	***(-3.85)***
AsymTime	0.85	*(1.20)*		0.96	*(0.93)*
ΔInvest* x *ST Debt	-26.63 *	*(-1.85)*		-18.19	*(-1.37)*
ST Debt	0.61	*(0.41)*		0.01	*(0.00)*
ΔInvest* x *Secured	5.33	*(1.23)*		-2.52	*(-0.46)*
Secured	-0.13	*(-0.25)*		-0.54	*(-0.80)*
ΔInvest* x *Asset Sale Restr	**16.80**	***(2.35)***		-7.63 *	*(-1.67)*
Asset Sale Restr	0.16	*(0.25)*		-0.25	*(-0.32)*
ΔInvest* x *Invest Restr	3.72	*(0.55)*		1.92	*(0.44)*
Invest Restr	-1.12	*(-1.41)*		1.09	*(1.53)*
Size	0.18	*(0.89)*		**-0.79**	***(-2.93)***
Leverage	-2.82 *	*(-1.82)*		0.57	*(0.33)*
MB	**0.22**	***(3.19)***		**0.44**	***(4.18)***
ROA	**-10.27**	***(-2.93)***		0.05	*(0.01)*
Cash	0.13	*(0.05)*		-4.04	*(-1.42)*
Firm Age	**0.05**	***(2.29)***		0.03	*(1.16)*
S&P 500 Ret	1.23	*(0.82)*		1.92	*(0.93)*
Exp Volatility	**2.15**	***(6.05)***		0.46	*(1.00)*
Riskless Rate	**1.42**	***(7.77)***		**1.47**	***(5.92)***
Default Spread	-2.78	*(-1.32)*		**7.09**	***(2.55)***
Adj. R-squared	9.3%			4.4%	
Observations	3,013			3,009	

Table VII

Risk Shifting within Distress Quintiles

Table VII presents the OLS estimates of the parameters in Equation (1) for each distress quintile of the Debt Covenant Sample containing 11,238 firm-year observations in total. All regressions are clustered by year and include firm fixed effects. All variables are defined in Appendix 2. Bolded coefficients indicate statistical significance at the 5% level (for a two-tailed test). The coefficients with an asterisk are significant at the 10% level. *p<1%*, p<*5%*, and p<*10%* refer to the test of the difference in the coefficients between the columns at the 1%, 5%, and 10% level, respectively.

$$\Delta SigA_{it+1} = \beta_0 + \beta_1 \times \Delta Invest_{it} + \beta_2 \times AsymTime_{it} + \beta_3 \times \Delta Invest_{it} \times AsymTime_{it} + Controls_{it} + \varepsilon_{it}$$

Equation (1) Estimated within the Distress Quintiles of the Debt Covenant Sample

		Quintile 1			Quintile 2			Quintile 3			Quintile 4			Quintile 5	
		Coef	T-stat		Coef	T-stat		Coef	T-stat		Coef	T-stat		Coef	T-stat
ΔInvest (β_1)	p<1%	1.35	(0.12)	p>10%	8.91	(0.91)	p>10%	-11.56	(-1.08)	p<5%	**22.29**	**(2.28)**	p>10%	**50.70**	**(4.27)**
AsymTime x ΔInvest (β_3)	p<10%	-4.92	(-0.82)	p>10%	-8.87	(-1.43)	p<10%	7.98	(1.38)	p<1%	**-24.44**	**(-3.70)**	p>10%	**-21.63**	**(-3.16)**
AsymTime		**3.35**	**(3.50)**		**2.13**	**(2.30)**		**2.22**	**(2.28)**		**2.11**	(1.86)		2.41	(1.41)
ST Debt x ΔInvest		-3.51	(-0.32)		15.88	(1.33)		12.08	(1.10)		7.50	(0.68)		**-38.90**	**(-2.87)**
ST Debt		0.06	(0.04)		2.06	(1.29)		0.26	(0.15)		-1.90	(-0.86)		4.78	(1.34)
Secured x ΔInvest		-8.84 *	(-1.78)		**-9.61**	**(-2.07)**		-1.06	(-0.27)		-1.36	(-0.30)		8.88 *	(1.79)
Secured		**-1.62**	**(-2.45)**		-0.04	(-0.06)		0.12	(0.19)		0.02	(0.03)		-0.35	(-0.31)
Asset Sale Restr x ΔInvest		**12.28**	**(2.47)**		**13.89**	**(2.79)**		5.42	(1.44)		3.02	(0.72)		**-16.29**	**(-3.08)**
Asset Sale Restr		-0.20	(-0.25)		-0.51	(-0.65)		-1.37	(-1.64)		-1.01	(-1.07)		1.89	(1.32)
Invest Restr x ΔInvest		**10.18**	**(2.03)**		**11.83**	**(2.23)**		-4.39	(-1.12)		**12.13**	**(2.63)**		-1.01	(-0.21)
Invest Restr		-0.61	(-0.75)		**1.84**	**(2.41)**		0.68	(0.90)		0.47	(0.58)		0.84	(0.73)
Size		**0.75**	**(3.52)**		**0.74**	**(3.36)**		**0.91**	**(4.02)**		**0.59**	**(2.17)**		**-1.08**	**(-2.89)**
Leverage		**-11.38**	**(-6.53)**		**-9.08**	**(-5.05)**		-3.46 *	(-1.91)		0.15	(0.08)		-0.37	(-0.15)
MB		**0.41**	**(5.36)**		**0.50**	**(5.92)**		**0.39**	**(4.21)**		**0.40**	**(4.04)**		0.17	(1.13)
ROA		**13.57**	**(4.24)**		**11.58**	**(4.23)**		**24.44**	**(8.00)**		**16.84**	**(5.02)**		**9.60**	**(2.59)**
Cash		**-5.71**	**(-3.31)**		-0.54	(-0.32)		**10.14**	**(6.11)**		**-4.75**	**(-2.20)**		-0.17	(-0.05)
Firm Age		**0.08**	**(3.26)**		**0.10**	**(3.74)**		**0.06**	**(2.26)**		**0.06**	**(2.02)**		0.02	(0.37)
S&P 500 Ret		-8.12 *	(-1.82)		4.73	(1.19)		3.25	(0.86)		**9.90**	**(2.44)**		16.55	**(2.75)**
Exp Volatility		-0.15	(-0.20)		**1.80**	**(2.28)**		0.83	(1.06)		0.11	(0.12)		0.94	(0.64)
Riskless Rate		**1.89**	**(2.80)**		**2.87**	**(4.41)**		**2.85**	**(5.07)**		**2.62**	**(3.89)**		**2.02**	**(1.96)**
Default Spread		**10.87**	**(3.14)**		6.06 *	(1.68)		**12.45**	**(3.58)**		**8.51**	**(2.07)**		**11.46**	**(1.95)**
Adj. R-squared		20.4%			16.1%			14.5%			10.1%			6.4%	
Observations		2,244			2,248			2,252			2,248			2,246	

Table VIII

Partitioning by Availability of Cash

Table VIII presents OLS estimates of the parameters in Equation (1) for the top distress quintile of the Debt covenant sample partitioned by whether a firm's CFO is less or more than its cross-sectional median. All regressions are clustered by year and include firm fixed effects. All variables are defined in Appendix 2. Bolded coefficients indicate statistical significance at the 5% level (for a two-tailed test). The coefficients with an asterisk are significant at the 10% level. *p<1%*, p<*5%*, and p<*10%* refer to the test of the difference in the coefficients between the columns at the 1%, 5%, and 10% level, respectively.

$$\Delta SigA_{it+1} = \beta_0 + \beta_1 \times \Delta Invest_{it} + \beta_2 \times AsymTime_{it} + \beta_3 \times \Delta Invest_{it} \times AsymTime_{it} + Controls_{it} + \varepsilon_{it}$$

Partitioning the Top Distress Quintile by the Cross-Sectional Median of *CFO*

	Low *CFO*			High *CFO*	
	Coef	T-stat		Coef	T-stat
ΔInvest (β₁)	**62.23**	***(3.51)***	*p>10%*	**67.58**	***(4.21)***
ΔInvest x AsymTime (β₃)	-16.00	*(-1.53)*	*p>10%*	**-32.59**	***(-3.41)***
AsymTime	3.59	*(1.31)*		1.43	*(0.69)*
ΔInvest x ST Debt	**-43.79**	***(-2.31)***		**-95.05**	***(-3.84)***
ST Debt	-0.34	*(-0.06)*		**14.96**	***(3.20)***
ΔInvest x Secured	3.18	*(0.45)*		**20.70**	***(2.79)***
Secured	0.61	*(0.34)*		-0.34	*(-0.25)*
ΔInvest x Asset Sale Restr	**-19.37**	***(-2.44)***		**-14.85**	***(-2.07)***
Asset Sale Restr	2.96	*(1.35)*		1.63	*(0.95)*
ΔInvest x Invest Restr	-0.38	*(-0.05)*		-5.11	*(-0.78)*
Invest Restr	3.79	***(2.09)***		-1.06	*(-0.77)*
Size	**-2.01**	***(-3.40)***		-0.47	*(-1.03)*
Leverage	3.51	*(0.96)*		-4.69	*(-1.50)*
MB	0.16	*(0.76)*		0.15	*(0.72)*
ROA	0.08	*(0.01)*		**19.69**	***(3.43)***
Cash	-0.62	*(-0.14)*		-2.88	*(-0.66)*
Firm Age	0.11	*(1.46)*		-0.07	*(-1.23)*
S&P 500 Ret	9.19 *	*(1.65)*		1.25	*(0.29)*
Exp Volatility	1.50 *	*(1.77)*		**2.58**	***(3.88)***
Riskless Rate	**1.71**	***(3.06)***		**1.41**	***(3.28)***
Default Spread	**18.76**	***(3.21)***		6.31	*(1.39)*
Adj. R-squared	6.5%			8.8%	
Observations	1,128			1,118	

Table IX – Panel A

Partitioning by Source of Debt

Table IX, Panel A presents OLS estimates of the parameters in Equation (1) for the subsamples containing syndicated debt only or public debt only. Column 1 includes only those observations that have public debt outstanding (but no syndicated debt) and Column 2 includes only those observations that have syndicated debt outstanding (but not public debt). All regressions are clustered by year and include firm fixed effects. All variables are defined in Appendix 2. Bolded coefficients indicate statistical significance at the 5% level (for a two-tailed test). The coefficients with an asterisk are significant at the 10% level. *p<1%*, p<*5%*, and p<*10%* refer to the test of the difference in the coefficients between the columns at the 1%, 5%, and 10% level, respectively.

$$\Delta SigA_{it+1} = \beta_0 + \beta_1 \times \Delta Invest_{it} + \beta_2 \times AsymTime_{it} + \beta_3 \times \Delta Invest_{it} \times AsymTime_{it} + Controls_{it} + \varepsilon_{it}$$

Panel A: Partitioning by Public Debt Only and Syndicated Debt Only

	Syndicated Debt Only			Public Debt Only	
	Coef	T-stat		Coef	T-stat
ΔInvest (β_1)	4.54	*(0.66)*	*p<1%*	**49.65**	***(4.29)***
AsymTime x ΔInvest (β_3)	-5.94	*(-1.37)*	*p<1%*	**-28.64**	***(-4.49)***
AsymTime	0.90	*(1.05)*		**2.35**	***(2.22)***
ST Debt x ΔInvest	9.12	*(1.35)*		-5.72	*(-0.45)*
ST Debt	0.36	*(0.28)*		-0.81	*(-0.37)*
Secured x ΔInvest	-3.76	*(-1.21)*		3.50	*(0.95)*
Secured	-0.61	*(-1.09)*		0.65	*(0.86)*
Asset Sale Restr x ΔInvest	1.95	*(0.69)*		**-14.65**	***(-2.06)***
Asset Sale Restr	-0.14	*(-0.23)*		1.47	*(1.07)*
Invest Restr x ΔInvest	4.87 *	*(1.70)*		12.49	*(1.19)*
Invest Restr	0.94	*(1.62)*		2.89	*(1.07)*
Size	***-0.41***	***(-1.99)***		-0.41 *	*(-1.78)*
Leverage	-1.89	*(-1.24)*		1.88	*(1.10)*
MB	**0.22**	***(2.53)***		**0.26**	***(3.37)***
ROA	2.84	*(1.17)*		**7.58**	***(3.11)***
Cash	**4.96**	***(2.18)***		1.23	*(0.87)*
Firm Age	**0.05**	***(2.20)***		**0.10**	***(3.23)***
S&P 500 Ret	**6.73**	***(3.63)***		-3.49	*(-1.46)*
Exp Volatility	0.53 *	*(1.71)*		**1.09**	***(3.30)***
Riskless Rate	**1.85**	***(9.05)***		**2.39**	***(11.07)***
Default Spread	**10.08**	***(4.77)***		-0.08	*(-0.03)*
Adj. R-squared	3.3%			8.8%	
Observations	4,613			3,341	

Table IX – Panel B

Partitioning by Source of Debt

Table IX, Panel B presents OLS estimates of the parameters in Equation (1) for the subsample that has public debt outstanding (but no syndicated debt). All regressions are clustered by year and include firm fixed effects. All variables are defined in Appendix 2. Bolded coefficients indicate statistical significance at the 5% level (for a two-tailed test). The coefficients with an asterisk are significant at the 10% level.

$$\Delta SigA_{it+1} = \beta_0 + \beta_1 \times \Delta Invest_{it} + \beta_2 \times AsymTime_{it} + \beta_3 \times \Delta Invest_{it} \times AsymTime_{it} + Controls_{it} + \varepsilon_{it}$$

Panel B: Public Debt Only

	(1)		(2)		(3)	
	Coef	T-stat	Coef	T-stat	Coef	T-stat
ΔInvest (β₁)	**64.53**	***(5.17)***	**43.67**	***(3.72)***	**57.16**	***(4.43)***
AsymTime* x *ΔInvest (β₃)	**-33.19**	***(-5.08)***	**-30.14**	***(-4.72)***	**-33.54**	***(-5.14)***
AsymTime	**2.11**	***(1.97)***	**2.24**	***(2.10)***	2.04 *	*(1.91)*
ST Debt* x *ΔInvest	-10.85	*(-0.84)*	-4.54	*(-0.35)*	-9.02	*(-0.70)*
ST Debt	-1.24	*(-0.57)*	-0.68	*(-0.31)*	-1.09	*(-0.50)*
Secured* x *ΔInvest	**7.67**	***(1.95)***	1.81	*(0.49)*	5.59	*(1.39)*
Secured	1.11	*(1.39)*	0.50	*(0.65)*	0.95	*(1.16)*
Asset Sale Restr* x *ΔInvest	**-16.83**	***(-2.36)***	**-16.85**	***(-2.36)***	**-18.18**	***(-2.55)***
Asset Sale Restr	1.21	*(0.88)*	1.38	*(1.01)*	1.17	*(0.85)*
Invest Restr* x *ΔInvest	3.72	*(0.34)*	9.98	*(0.95)*	3.37	*(0.31)*
Invest Restr	2.33	*(0.86)*	2.78	*(1.03)*	2.31	*(0.85)*
Convertible* x *ΔInvest	**-13.20**	***(-3.09)***			**-10.80**	***(-2.45)***
Convertible	-1.53 *	*(-1.71)*			-1.38	*(-1.53)*
Cross Default* x *ΔInvest			**11.70**	***(2.97)***	**9.16**	***(2.26)***
Cross Default			0.78	*(1.06)*	0.59	*(0.79)*
Size	-0.42 *	*(-1.83)*	-0.40 *	*(-1.75)*	-0.42 *	*(-1.80)*
Leverage	1.79	*(1.05)*	1.98	*(1.16)*	1.87	*(1.10)*
MB	**0.26**	***(3.40)***	**0.25**	***(3.37)***	0.26	***(3.39)***
ROA	**7.41**	***(3.03)***	**7.77**	***(3.19)***	**7.56**	***(3.10)***
Cash	1.85	*(1.26)*	1.23	*(0.87)*	1.80	*(1.22)*
Firm Age	**0.09**	***(2.98)***	**0.10**	***(3.33)***	**0.09**	***(3.06)***
S&P 500 Ret	-3.63	*(-1.52)*	-3.77	*(-1.58)*	-3.82	*(-1.60)*
Exp Volatility	**0.95**	***(2.82)***	**1.05**	***(3.18)***	**0.94**	***(2.77)***
Riskless Rate	**2.38**	***(10.98)***	**2.39**	***(11.04)***	**2.37**	***(10.95)***
Default Spread	0.29	*(0.12)*	-0.12	*(-0.05)*	0.21	*(0.09)*
Adj. R-squared	9.1%		9.1%		9.3%	
Observations	3,341		3,341		3,341	

Table IX – Panel C

Partitioning by Source of Debt

Table IX, Panel C presents OLS estimates of the parameters in Equation (1) for the subsample that that has syndicated debt outstanding (but no public debt). All regressions are clustered by year and include firm fixed effects. All variables are defined in Appendix 2. Bolded coefficients indicate statistical significance at the 5% level (for a two-tailed test). The coefficients with an asterisk are significant at the 10% level.

$$\Delta SigA_{it+1} = \beta_0 + \beta_1 \times \Delta Invest_{it} + \beta_2 \times AsymTime_{it} + \beta_3 \times \Delta Invest_{it} \times AsymTime_{it} + Controls_{it} + \varepsilon_{it}$$

Panel C: Syndicated Debt Only

	(1)		(2)		(3)	
	Coef	T-stat	Coef	T-stat	Coef	T-stat
ΔInvest (β_1)	4.38	*(0.64)*	4.51	*(0.66)*	4.34	*(0.63)*
AsymTime x *ΔInvest* (β_3)	-6.10	*(-1.41)*	-6.04	*(-1.39)*	-6.19	*(-1.43)*
AsymTime	0.91	*(1.05)*	0.92	*(1.07)*	0.93	*(1.07)*
ST Debt x *ΔInvest*	8.90	*(1.32)*	9.44	*(1.40)*	9.21	*(1.36)*
ST Debt	0.37	*(0.28)*	0.36	*(0.28)*	0.37	*(0.29)*
Secured x *ΔInvest*	-3.86	*(-1.24)*	-3.63	*(-1.17)*	-3.74	*(-1.20)*
Secured	-0.64	*(-1.12)*	-0.62	*(-1.11)*	-0.65	*(-1.14)*
Asset Sale Restr x *ΔInvest*	1.13	*(0.38)*	2.40	*(0.79)*	1.55	*(0.48)*
Asset Sale Restr	-0.16	*(-0.27)*	-0.20	*(-0.34)*	-0.23	*(-0.38)*
Invest Restr x *ΔInvest*	4.38	*(1.50)*	5.04 *	*(1.73)*	4.54	*(1.53)*
Invest Restr	0.90	*(1.50)*	0.93	*(1.60)*	0.90	*(1.48)*
Leveraged x *ΔInvest*	2.51	*(0.84)*			2.45	*(0.82)*
Leveraged	0.17	*(0.27)*			0.16	*(0.26)*
Perform Pricing x *ΔInvest*			-1.22	*(-0.38)*	-1.09	*(-0.33)*
Perform Pricing			0.54	*(0.74)*	0.53	*(0.73)*
Size	**-0.41**	***(-1.98)***	**-0.48**	***(-2.13)***	**-0.48**	***(-2.12)***
Leverage	-1.96	*(-1.26)*	-1.91	*(-1.25)*	-1.97	*(-1.27)*
MB	**0.23**	***(2.55)***	**0.23**	***(2.58)***	**0.23**	***(2.60)***
ROA	2.88	*(1.18)*	2.97	*(1.22)*	3.00	*(1.23)*
Cash	**4.85**	***(2.13)***	**5.09**	***(2.24)***	**4.98**	***(2.18)***
Firm Age	**0.06**	***(2.20)***	**0.06**	***(2.22)***	**0.06**	***(2.22)***
S&P 500 Ret	**6.72**	***(3.62)***	**6.83**	***(3.67)***	**6.82**	***(3.66)***
Exp Volatility	0.53 *	*(1.73)*	0.52 *	*(1.69)*	0.53 *	*(1.70)*
Riskless Rate	**1.85**	***(9.03)***	**1.85**	***(9.06)***	**1.85**	***(9.04)***
Default Spread	**10.02**	***(4.73)***	**10.08**	***(4.76)***	**10.02**	***(4.73)***
Adj. R-squared	3.3%		3.3%		3.3%	
Observations	4,613		4,613		4,613	

Table X

Time-Series Partitioning

Table X presents OLS estimates of the parameters in Equation (1) for the Debt Covenant Sample partitioned by whether an observation belongs to the pre-Sox (1995 – 2002) or the post-Sox (2003 – 2006) period. All regressions are clustered by year and include firm fixed effects. All variables are defined in Appendix 2. Bolded coefficients indicate statistical significance at the 5% level (for a two-tailed test). The coefficients with an asterisk are significant at the 10% level. *p<1%*, p<*5%*, and p<*10%* refer to the test of the difference in the coefficients between the columns at the 1%, 5%, and 10% level, respectively.

$$\Delta SigA_{it+1} = \beta_0 + \beta_1 \times \Delta Invest_{it} + \beta_2 \times AsymTime_{it} + \beta_3 \times \Delta Invest_{it} \times AsymTime_{it} + Controls_{it} + \varepsilon_{it}$$

Partitioning by the Adoption of the Sarbanes-Oxley Act in 2002

	Pre-SOX Period			Post-SOX Period	
	Coef	T-stat		Coef	T-stat
ΔInvest (β_1)	**20.88**	***(3.67)***	*p>10%*	12.84	*(0.91)*
ΔInvest x AsymTime (β_3)	**-10.07**	***(-3.03)***	*p>10%*	**-18.43**	***(-2.53)***
AsymTime	0.46	*(0.62)*		**2.40**	***(3.21)***
ΔInvest x ST Debt	-4.04	*(-0.66)*		1.46	*(0.11)*
ST Debt	-1.15	*(-0.86)*		0.65	*(0.50)*
ΔInvest x Secured	-3.00	*(-1.17)*		**16.36**	***(3.71)***
Secured	-0.09	*(-0.18)*		-0.23	*(-0.46)*
ΔInvest x Asset Sale Restr	1.47	*(0.61)*		-6.10	*(-0.75)*
Asset Sale Restr	0.10	*(0.19)*		0.24	*(0.28)*
ΔInvest x Invest Restr	1.20	*(0.50)*		10.73 *	*(1.77)*
Invest Restr	**1.17**	***(2.08)***		-0.01	*(-0.02)*
Size	**-0.38**	***(-2.34)***		**-0.66**	***(-3.85)***
Leverage	-0.72	*(-0.56)*		0.13	*(0.10)*
MB	**0.25**	***(3.73)***		**0.16**	***(2.63)***
ROA	2.51	*(1.30)*		**7.21**	***(3.09)***
Cash	**4.78**	***(3.47)***		**-7.96**	***(-6.18)***
Firm Age	**0.06**	***(3.04)***		**0.06**	***(3.24)***
S&P 500 Ret	3.00 *	*(1.79)*		**-10.71**	***(-3.69)***
Exp Volatility	**1.36**	***(4.31)***		**-3.36**	***(-2.55)***
Riskless Rate	**2.97**	***(10.87)***		0.20	*(0.38)*
Default Spread	**11.15**	***(4.98)***		**12.19**	***(2.89)***
Adj. R-squared	3.7%			7.8%	
Observations	7,029			4,209	

Table XI – Panel A

Robustness Tests

Table XI, Panel A presents the OLS estimates of the parameters in Equation (1) for the Debt Covenant Sample containing 11.238 firm-year observations. Equity value volatility (*SigE*) is used a dependent variable instead of asset value volatility (*SigA*). All regressions are clustered by year and include firm fixed effects. All variables are defined in Appendix 2. Bolded coefficients indicate statistical significance at the 5% level (for a two-tailed test). The coefficients with an asterisk are significant at the 10% level.

$$\Delta SigE_{it+1} = \beta_0 + \beta_1 \times \Delta Invest_{it} + \beta_2 \times AsymTime_{it} + \beta_3 \times \Delta Invest_{it} \times AsymTime_{it} + Controls_{it} + \varepsilon_{it}$$

Panel A: Δ*SigE* Is Used as a Dependent Variable instead of Δ*SigA*

	(1)		(2)		(3)		(4)		(5)		(6)	
	Coef	T-stat	Coef	T-stat	Coef	T-stat	Coef	T-stat	Coef	T-stat	Coef	T-stat
ΔInvest (β_1)	**38.33**	***(4.47)***	**44.64**	***(3.89)***	**33.37**	***(3.42)***	**40.67**	***(4.52)***	**40.09**	***(4.52)***	**47.18**	***(3.67)***
ΔInvest x AsymTime (β_3)	**-19.09**	***(-2.81)***	**-18.06**	***(-2.66)***	**-17.01**	***(-2.41)***	**-21.42**	***(-3.01)***	**-18.16**	***(-2.63)***	**-17.88**	***(-2.42)***
AsymTime	**4.66**	***(2.52)***	**3.92**	***(2.13)***	**4.73**	***(2.56)***	**4.80**	***(2.60)***	**4.60**	***(2.49)***	**4.04**	***(2.18)***
ΔInvest x ST Debt			-13.26	*(-0.94)*							-19.28	*(-1.31)*
ST Debt			**18.30**	***(4.76)***							**18.50**	***(4.81)***
ΔInvest x Secured					5.60	*(1.07)*					8.26	*(1.54)*
Secured					0.41	*(0.34)*					-0.17	*(-0.13)*
ΔInvest x Asset Sale Restr							-5.82	*(-1.06)*			-10.87 *	*(-1.90)*
Asset Sale Restr							2.82 *	*(1.86)*			2.92 *	*(1.94)*
ΔInvest x Invest Restr									-3.53	*(-0.70)*	-4.17	*(-0.80)*
Invest Restr									1.39	*(1.14)*	1.19	*(0.96)*
Size	-0.26	*(-0.67)*	-0.07	*(-0.19)*	-0.24	*(-0.63)*	-0.44	*(-1.12)*	-0.20	*(-0.50)*	-0.22	*(-0.54)*
Leverage	2.89	*(1.13)*	0.77	*(0.30)*	2.96	*(1.15)*	2.39	*(0.93)*	2.65	*(1.03)*	0.14	*(0.06)*
MB	-0.02	*(-0.11)*	0.00	*(-0.01)*	-0.02	*(-0.11)*	-0.01	*(-0.09)*	-0.01	*(-0.08)*	0.01	*(0.03)*
ROA	**-11.61**	***(-2.90)***	**-9.86**	***(-2.47)***	**-11.46**	***(-2.86)***	**-11.71**	***(-2.93)***	**-12.01**	***(-2.99)***	**-10.06**	***(-2.51)***
Cash	-5.70 *	*(-1.75)*	-5.10	*(-1.57)*	-5.49 *	*(-1.68)*	-6.06 *	*(-1.86)*	-4.76	*(-1.43)*	-4.51	*(-1.36)*
Firm Age	-0.02	*(-0.38)*	-0.03	*(-0.61)*	-0.02	*(-0.37)*	-0.02	*(-0.43)*	-0.01	*(-0.24)*	-0.03	*(-0.56)*
S&P 500 Ret	-5.82	*(-1.51)*	-5.65	*(-1.48)*	-5.74	*(-1.49)*	-5.10	*(-1.32)*	-5.40	*(-1.40)*	-4.39	*(-1.14)*
Exp Volatility	**5.07**	***(8.72)***	**5.16**	***(8.91)***	**5.07**	***(8.69)***	**5.12**	***(8.79)***	**5.09**	***(8.75)***	**5.26**	***(9.03)***
Riskless Rate	**3.40**	***(8.94)***	**3.36**	***(8.89)***	**3.41**	***(8.94)***	**3.52**	***(9.16)***	**3.43**	***(8.97)***	**3.52**	***(9.17)***
Default Spread	**11.26**	***(2.78)***	**11.12**	***(2.76)***	**11.26**	***(2.78)***	**10.99**	***(2.71)***	**11.40**	***(2.82)***	**10.95**	***(2.72)***
Adj. R-squared	12.9%		13.9%		12.9%		13.1%		12.9%		14.3%	
Observations	11,238		11,238		11,238		11,238		11,238		11,238	

Table XI – Panel B

Robustness Tests

Table XI, Panel B presents the OLS estimates of the parameters in Equation (1) for the Debt Covenant Sample containing 11.238 firm-year observations. *Capex + R&D* is used to calculate *Invest* instead of *Capex*. All regressions are clustered by year and include firm fixed effects. All variables are defined in Appendix 2. Bolded coefficients indicate statistical significance at the 5% level (for a two-tailed test). The coefficients with an asterisk are significant at the 10% level.

$$\Delta SigA_{it+1} = \beta_0 + \beta_1 \times \Delta Invest_{it} + \beta_2 \times AsymTime_{it} + \beta_3 \times \Delta Invest_{it} \times AsymTime_{it} + Controls_{it} + \varepsilon_{it}$$

Panel B: Alternative Proxy for *Invest* is used in Equation (1)

	(1)		(2)		(3)		(4)		(5)		(6)	
	Coef	T-stat	Coef	T-stat	Coef	T-stat	Coef	T-stat	Coef	T-stat	Coef	T-stat
ΔInvest (β_1)	**11.00**	***(3.56)***	**11.28**	***(3.53)***	**9.48**	***(2.99)***	**11.57**	***(3.70)***	**10.95**	***(3.54)***	**10.79**	***(3.28)***
ΔInvest x AsymTime (β_3)	**-13.22**	***(-2.52)***	**-12.96**	***(-2.43)***	**-10.85**	***(-2.03)***	**-15.25**	***(-2.82)***	**-13.69**	***(-2.57)***	**-11.82**	***(-2.08)***
AsymTime	3.16 *	*(1.85)*	2.88 *	*(1.68)*	3.24 *	*(1.90)*	3.25 *	*(1.91)*	3.07 *	*(1.80)*	2.98 *	*(1.74)*
ΔInvest x ST Debt			-2.55	*(-0.26)*							-12.19	*(-1.12)*
ST Debt			**7.05**	***(1.99)***							**7.09**	***(2.00)***
ΔInvest x Secured					**9.46**	***(2.17)***					**13.32**	***(2.76)***
Secured					0.44	*(0.40)*					0.12	*(0.11)*
ΔInvest x Asset Sale Restr							-6.73	*(-1.37)*			**-10.93**	***(-2.14)***
Asset Sale Restr							1.93	*(1.38)*			1.92	*(1.37)*
ΔInvest x Invest Restr									2.13	*(0.48)*	-0.12	*(-0.03)*
Invest Restr									1.30	*(1.15)*	1.12	*(0.98)*
Size	**-1.11**	***(-3.10)***	**-1.04**	***(-2.89)***	**-1.09**	***(-3.03)***	**-1.24**	***(-3.38)***	**-1.04**	***(-2.86)***	**-1.10**	***(-2.94)***
Leverage	1.15	*(0.49)*	0.33	*(0.14)*	1.26	*(0.53)*	0.79	*(0.33)*	0.95	*(0.40)*	-0.02	*(-0.01)*
MB	0.17	*(1.10)*	0.17	*(1.14)*	0.16	*(1.09)*	0.17	*(1.12)*	0.17	*(1.11)*	0.17	*(1.16)*
ROA	**8.73**	***(2.36)***	**9.39**	***(2.53)***	**8.97**	***(2.43)***	**8.66**	***(2.34)***	**8.36**	***(2.25)***	**9.40**	***(2.53)***
Cash	1.23	*(0.40)*	1.53	*(0.49)*	1.26	*(0.41)*	0.99	*(0.32)*	1.91	*(0.61)*	2.15	*(0.68)*
Firm Age	0.02	*(0.37)*	0.01	*(0.27)*	0.02	*(0.35)*	0.02	*(0.34)*	0.02	*(0.46)*	0.01	*(0.30)*
S&P 500 Ret	3.79	*(1.07)*	3.86	*(1.09)*	3.84	*(1.08)*	4.39	*(1.23)*	4.05	*(1.14)*	4.91	*(1.37)*
Exp Volatility	**1.93**	***(3.59)***	**1.96**	***(3.65)***	**1.94**	***(3.61)***	**1.96**	***(3.64)***	**1.93**	***(3.59)***	**2.03**	***(3.76)***
Riskless Rate	**1.41**	***(4.00)***	**1.39**	***(3.97)***	**1.42**	***(4.03)***	**1.50**	***(4.22)***	**1.45**	***(4.10)***	**1.53**	***(4.30)***
Default Spread	**11.95**	***(3.21)***	**11.90**	***(3.20)***	**11.99**	***(3.22)***	**11.81**	***(3.16)***	**12.17**	***(3.26)***	**11.93**	***(3.20)***
Adj. R-squared	4.1%		4.3%		4.3%		4.3%		4.2%		4.9%	
Observations	11,238		11,238		11,238		11,238		11,238		11,238	

Table XI – Panel C

Robustness Tests

Table XI, Panel C presents the OLS estimates of the parameters in Equation (1) for the Debt Covenant Sample containing 11,238 firm-year observations estimated within each distress quintile. All regressions are clustered by year and include firm fixed effects. All variables are defined in Appendix 2. Bolded coefficients indicate statistical significance at the 5% level (for a two-tailed test). The coefficients with an asterisk are significant at the 10% level. *p<1%*, p<*5%*, and p<*10%* refer to the test of the difference in the coefficients between the columns at the 1%, 5%, and 10% level, respectively.

$$\Delta SigA_{it+1} = \beta_0 + \beta_1 \times \Delta Invest_{it} + \beta_2 \times AsymTime_{it} + \beta_3 \times \Delta Invest_{it} \times AsymTime_{it} + Controls_{it} + \varepsilon_{it}$$

Panel C: Equation (1) Estimated within the Leverage Quintiles of the Debt Covenant Sample

		Quintile 1			Quintile 2			Quintile 3			Quintile 4			Quintile 5	
		Coef	T-stat		Coef	T-stat		Coef	T-stat		Coef	T-stat		Coef	T-stat
ΔInvest (β_1)	*p>5%*	10.64	*(1.10)*	*p>10%*	-1.87	*(-0.19)*	*p>10%*	18.72	*(1.44)*	*p>10%*	17.61	*(1.43)*	*p>10%*	**47.37**	***(3.04)***
AsymTime x ΔInvest (β_3)	***p>1%***	0.98	*(0.14)*	*p>10%*	0.19	*(0.03)*	***p>5%***	-6.83	*(-1.03)*	*p>10%*	**-17.91**	***(-2.70)***	*p>10%*	**-22.36**	***(-3.04)***
AsymTime		1.45	*(1.04)*		1.79	*(1.61)*		**2.09**	***(2.03)***		-0.11	*(-0.10)*		2.10	*(1.48)*
ST Debt x ΔInvest		8.06	*(0.78)*		9.78	*(0.98)*		3.06	*(0.23)*		0.40	*(0.03)*		-29.84 *	*(-1.73)*
ST Debt		-0.61	*(-0.35)*		-2.83	*(-1.37)*		-1.98	*(-0.90)*		2.23	*(0.93)*		-0.14	*(-0.05)*
Secured x ΔInvest		-8.20 *	*(-1.75)*		1.45	*(0.31)*		4.78	*(0.83)*		8.78 *	*(1.88)*		-3.27	*(-0.66)*
Secured		-0.11	*(-0.13)*		0.33	*(0.45)*		-0.33	*(-0.46)*		-0.20	*(-0.27)*		0.36	*(0.36)*
Asset Sale Restr x ΔInvest		3.73	*(0.83)*		-2.37	*(-0.56)*		**18.70**	***(3.32)***		-8.29 *	*(-1.70)*		-0.22	*(-0.04)*
Asset Sale Restr		0.37	*(0.37)*		-0.60	*(-0.68)*		0.86	*(0.94)*		1.63 *	*(1.72)*		1.15	*(0.88)*
Invest Restr x ΔInvest		0.41	*(0.08)*		5.69	*(1.33)*		6.97	*(1.46)*		**-11.19**	***(-2.49)***		5.96	*(1.07)*
Invest Restr		**2.21**	***(2.25)***		-0.98	*(-1.15)*		0.88	*(1.07)*		0.86	*(0.95)*		1.08	*(1.03)*
Size		-0.58 *	*(-1.83)*		0.05	*(0.19)*		-0.45 *	*(-1.85)*		-0.46 *	*(-1.68)*		**-1.07**	***(-3.50)***
Leverage		-1.64	*(-0.30)*		-0.58	*(-0.06)*		**-19.41**	***(-1.99)***		**-27.61**	***(-2.25)***		-2.12	*(-0.70)*
MB		0.31	*(1.31)*		**0.64**	***(3.26)***		**0.91**	***(5.06)***		**0.61**	***(3.55)***		**0.15**	***(2.22)***
ROA		**12.80**	***(3.77)***		-1.18	*(-0.32)*		**-19.69**	***(-4.96)***		**3.86**	*(0.95)*		4.02	*(1.35)*
Cash		**4.73**	***(2.48)***		**-4.45**	***(-2.08)***		**-9.29**	***(-3.35)***		**-14.50**	***(-5.60)***		0.49	*(0.19)*
Firm Age		0.07	*(1.64)*		0.04	*(1.43)*		**0.08**	***(2.99)***		0.04	*(1.21)*		**0.12**	***(2.92)***
S&P 500 Ret		2.22	*(0.79)*		2.30	*(0.98)*		3.53	*(1.57)*		1.00	*(0.42)*		-5.67 *	*(-1.80)*
Exp Volatility		**1.22**	***(2.70)***		0.61	*(1.60)*		0.68 *	*(1.92)*		**0.88**	***(2.28)***		0.57	*(1.17)*
Riskless Rate		**2.80**	***(9.76)***		**2.04**	***(8.44)***		**1.60**	***(7.03)***		**2.05**	***(8.62)***		**1.60**	***(5.15)***
Default Spread		0.99	*(0.34)*		**6.24**	***(2.48)***		**5.34**	***(2.22)***		**8.29**	***(3.32)***		4.20	*(1.24)*
Adj. R-squared		9.3%			7.3%			6.9%			6.4%			3.9%	
Observations		2,244			2,248			2,252			2,248			2,246	

Table XI – Panel D

Robustness Tests

Table XI, Panel D presents OLS estimates of the parameters in Equation (1) for Debt Covenant Sample consisting of 11,238 firm-year observations partitioned by whether a firm's lease intensity (*Lease*) is less or more than its cross-sectional median. All regressions are clustered by year and include firm fixed effects. All variables are defined in Appendix 2. Bolded coefficients indicate statistical significance at the 5% level (for a two-tailed test). The coefficients with an asterisk are significant at the 10% level. *p<1%*, p<*5%*, and p<*10%* refer to the test of the difference in the coefficients between the columns at the 1%, 5%, and 10% level, respectively.

$$\Delta SigA_{it+1} = \beta_0 + \beta_1 \times \Delta Invest_{it} + \beta_2 \times AsymTime_{it} + \beta_3 \times \Delta Invest_{it} \times AsymTime_{it} + Controls_{it} + \varepsilon_{it}$$

Panel D: Partitioning by the Cross-Sectional Median of Lease Intensity

	Low Lease Intensity			High Lease Intensity	
	Coef	T-stat		Coef	T-stat
ΔInvest (β_1)	**57.02**	***(4.04)***	*p>10%*	55.08 *	*(1.72)*
ΔInvest x AsymTime (β_3)	**-23.46**	***(-2.89)***	*p>10%*	**-45.03**	***(-2.31)***
AsymTime	2.30	*(0.95)*		3.25	*(1.52)*
ΔInvest x ST Debt	**-44.93**	***(-2.79)***		-6.29	*(-0.18)*
ST Debt	2.59	*(0.50)*		6.94	*(1.61)*
ΔInvest x Secured	6.88	*(1.11)*		**21.79**	***(2.36)***
Secured	-0.74	*(-0.45)*		0.34	*(0.25)*
ΔInvest x Asset Sale Restr	**-17.79**	***(-2.89)***		9.43	*(0.50)*
Asset Sale Restr	3.02 *	*(1.69)*		0.68	*(0.26)*
ΔInvest x Invest Restr	0.74	*(0.13)*		-28.53 *	*(-1.77)*
Invest Restr	1.14	*(0.73)*		0.64	*(0.42)*
Size	**-1.28**	***(-2.43)***		-0.64	*(-1.32)*
Leverage	-1.93	*(-0.55)*		2.17	*(0.74)*
MB	0.08	*(0.33)*		0.27 *	*(1.72)*
ROA	**13.10**	***(2.63)***		2.35	*(0.45)*
Cash	2.74	*(0.60)*		-3.39	*(-0.94)*
Firm Age	0.04	*(0.63)*		-0.01	*(-0.24)*
S&P 500 Ret	4.34	*(0.86)*		9.92	*(1.17)*
Exp Volatility	1.28	*(1.33)*		-1.60	*(-0.46)*
Riskless Rate	**1.85**	***(2.18)***		-0.24	*(-0.17)*
Default Spread	**18.30**	***(2.61)***		15.99	*(1.40)*
Adj. R-squared	5.9%			6.9%	
Observations	5,617			5,621	