DISTRESS RISK PREMIA IN STOCK AND BOND RETURNS

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ABSTRACT

This paper investigates whether the potential for rent extraction due to shareholders' strategic actions is reflected *ex ante* in stock and bond prices based on a joint study of stock and bond markets. I document that higher default probabilities are associated with higher yield spreads and bond returns but not with higher stock returns. Shareholder advantage has no significant effect on distress risk premia in stock or bond returns for firms with bonds outstanding. I also find that the negative relationship between distress risk and stock returns is more evident for firms with high trading costs and arbitrage risk. My findings suggest that the stock market, but not the bond market, misprices distress risk.

INTRODUCTION

Distress risk is the probability that a company will not have enough financial resources to meet its financial obligations in the future. Contrary to the traditional view that investors demand a positive premium for holding stocks of firms that have a higher probability of default, previous studies often found that distressed firms tend to have low average stock returns. There are two prevalent explanations for this anomaly. First, the negative returns to credit risk-based portfolio strategies result from systematic mispricing of extreme credit risk securities *i.e.*, the market mispricing hypothesis (Dichev (1998), Griffin and Lemmon (2002), and Campbell, Hilscher, and Szilagyi (2006)). Second, rent extraction from strategic interactions between claimholders leads to lower expected equity returns as default probability increases, *i.e.*, the conflict of interest hypothesis (Garlappi, Shu, and Yan (2006), henceforth GSY).[1] GSY demonstrate that the potential debt concessions in distressed renegotiations reduce the effective leverage of equity, leading to lower risk and hence lower expected returns for equity, as default risk increases. They provide evidence that the potential for rent extraction due to shareholder advantage in distressed firms might be one of the main reasons that traditional risk-return models fail to explain the negative relationship between distress risk and stock returns.

In an efficient capital market, any rent extraction accruing to shareholders from debtholders may also affect expected returns on bond. Numerous structural bond pricing

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[1] The theoretical literature since Hart and Moore (1994, 1998) has underlined the difference between *liquidity default*, where the firm does not have enough cash flows to honor the debt contract, and *strategic default*, where the firm fails to honor the debt contract even though it has the financial resources to do so. Here and following, the word “strategic action” is used synonymously with “shareholder advantage.”

models have argued that strategic default may increase default risk and boost yield spreads significantly.[2] This study investigates whether firm-specific characteristics that influence shareholders' strategic decisions are reflected *ex ante* in asset prices based on a joint study of stock and bond markets. Specifically, I explore the empirical relationship between these strategic variables and distress risk premia in stock and bond returns by focusing on firms with bonds outstanding. These firms have relatively strong shareholder advantage, and asset prices of these firms are thus likely to reflect the importance of shareholders' strategic actions.[3] I find that the impact of shareholder advantage on the relationship between distress risk and returns and distress risk and yield spreads is generally insignificant. This evidence suggests that a risk-based explanation, as proposed by the conflict of interest hypothesis, cannot explain the distress anomaly. I also examine an alternative explanation within the theoretical framework of the limits of arbitrage (Shleifer and Vishny (1997)) and find supporting evidence for the market mispricing hypothesis.

I execute my study in four steps. First, I estimate the KMV-Merton (1974) model to compute the probability of default, denoted as DLI (Default Likelihood Indicator), for individual firms and assess the effect of default risk on equity and bond returns. The negative relationship between distress risk and stock returns remains significant for firms with bonds outstanding and firms without bonds. Conversely, there is a significant and

[2] See, for example, Leland (1994), Anderson and Sundaresan (1996), Mella-Barral and Perraudin (1997), Fan and Sundaresan (2000), and Broadie, Chernov, and Sundaresan (2004).

[3] Firms with public debt are less subject to close monitoring by private creditors like banks (Diamond (1991)). The empirical literature also documents evidence consistent with the idea that public bondholders are more susceptible to shareholders' strategic actions than banks (Asquith, Gertner, and Scharfstein (1994), Betker (1995), Gilson (1997), Moody's Investors Service (1999), and Helwege (1999)).

positive relationship between distress risk and bond returns and distress risk and yield spreads. The positive distress risk premia in bond returns are robust to illiquidity effects, choice of methodology, and model specification.

Second, I examine the impact of shareholder advantage on stock returns through a sub-portfolio analysis and a multivariate regression analysis. The corporate finance literature has documented the effects of firm-specific factors on the nature and outcome of distressed restructurings.[4] Such factors determine either the bargaining positions of different claimholders in debt renegotiations (bargaining power) or the loss of firm value relative to the going concern when the firm is liquidated upon default (liquidation costs). Strong shareholder bargaining power and high liquidation costs create incentives for shareholders to default opportunistically in order to secure debt concessions. These factors are thus good proxies for shareholders' strategic actions concerning default and distressed renegotiations. By comparing firms with low and high shareholder advantage, we can thus draw conclusions about the significance of the potential for wealth transfers due to shareholder advantage and the impact of this potential on distress risk premia in stock and bond returns. In the stock market, the conflict of interest hypothesis predicts that for a given probability of default stock returns decline in shareholders' bargaining power and the firm's liquidation costs. It also predicts a hump-shaped or negative relationship between DLI and stock returns for firms with strong shareholder advantage. These predictions are referred to as the "shareholder advantage effect" in the paper. As documented in GSY, a stock return pattern that is consistent with these predictions is

[4] See, *e.g.*, Betker (1995), Eberhart, Moore, and Roenfeldt (1990), Weiss (1990), Gilson, John, and Lang (1990), Gilson (1997), Franks and Torous (1989, 1994), and Asquith, Gertner, and Scharfstein (1994).

found in the full sample. However, this pattern is not found for firms with bonds outstanding, and the results in the full sample are driven by firms without bonds outstanding.

I further examine the effect of strategic actions on asset prices in a small sample with valid bond trades from 1994 to 2006. If the potential for rent extraction due to shareholder advantage is significant, one should observe that the positive distress risk premia in bond returns is more evident for firms with strong shareholder advantage. However, there is no difference in the relationship between distress risk and (stock and bond) returns and distress risk and yield spreads across firms with strong and weak shareholder advantage. There is no evidence that the bonds of distressed firms significantly suffer from shareholder advantage *ex ante*. This evidence indicates that the potential for rent extraction from bondholders to shareholders due to shareholders' strategic actions in distressed firms is not large and cannot explain the difference in distress risk premia in stock and bond returns. Distressed renegotiations can be efficiency enhancing and not necessarily a zero-sum game because inefficient liquidation is avoided.[5] As a result, relative to no renegotiations, renegotiations may increase recovery rate and lower yield spreads. However, this argument may not affect the empirical work to examine the shareholder advantage effect on the potential rent extraction from bondholders to shareholders. If the potential for rent extraction from strategic interactions is significant to lower risk for equity, this potential should also

[5] Debtholders could become better off by offering to reduce the debt claim so as to avoid bankruptcy costs (Haugen and Senbet (1978, 1988) and Mella-Barral (1999)) and alleviate the underinvestment problem (Gertner and Scharfsteein (1991)).

increase risk for bond. As a result, for a given probability of default, expected equity returns decrease in shareholder advantage, and the opposite is true for expected bond returns.[6] Failure to confirm this prediction in the data suggests that the potential for rent extraction from bondholders to shareholders is not significant.

One might argue that failure to observe the shareholder advantage effect on asset prices for firms with public debt does not necessarily suggest the absence of a significant potential for rent extraction from debtholders.[7] It is possible that, for firms with bonds outstanding, the holdout problems encountered when these firms' debt is held by a large number of diffuse bond investors make strategic default less attractive to shareholders.[8] In the third step, I explore this possibility by examining how the shareholder advantage effect on stock returns is related to financial leverage and renegotiation frictions.[9] The value of the option to strategically default is greater for firms with higher leverage, and the potential for rent extraction due to shareholders' strategic actions is likely to be significant for firms with few renegotiation frictions. These conjectures, however, are not confirmed for sample of firms with no public debt or firms in the full sample. Overall, despite the importance of shareholder advantage for default and recovery-related decisions, bargaining power and liquidation costs have a minimal impact on distress risk premia in stock returns.

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[6] See Fan and Sundaresan (2000) Tables 2 and 3 for comparative statistics and simulation results.

[7] The sample of firms with bonds outstanding may not be a random sample with respect to the probability of strategic default. See discussions on the limitation of research in Section 3.7.

[8] Theoretical models have argued that the dispersed bond ownership with atomistic bondholders may make bond contracts effectively non-renegotiable (Hege and Mella-Barral (2005) and Bolton and Scharfstein (1996)).

[9] Renegotiation frictions measure how easily renegotiations can be carried out. High renegotiation frictions harden firms' incentives to renegotiate their debt contracts *ex ante* (Davydenko and Strebulaev (2006)). Also see Francois and Morellec (2004), Mella-Barral and Perraudin (1997), and Hege and Mella-Barral (2005).

If the lower stock returns for distressed stocks represent mispricing due to investors' systematic bias in expectations, then why do professional arbitrageurs fail to exploit this opportunity and quickly eliminate the mispricing? In the fourth part of my analysis, I address this question raised in Campbell, Hilscher, and Szilagyi (2006). The authors suggest that rational investors may be reluctant to short distressed stocks because of the limits of arbitrage. Shleifer and Vishny (1997) argue that risk due to the volatility of arbitrage returns deters arbitrage activity. Consistent with these arguments, I find that the negative relationship between distress risk and stock returns is more evident for firms with high arbitrage risk and transaction costs.

The remainder of the paper is organized as follows. Section I describes distress measures, sampling, and summary statistics. Section II reports distress risk premia in stock and bond returns. Sections III and IV test the conflict of interest hypothesis for the sub-sample of firms with and without bonds outstanding, respectively. Section V tests the market mispricing hypothesis. Section VI concludes.

1. SAMPLE CONSTRUCTION AND SUMMARY STATISTICS

1.1 Measuring Distress Risk

There is an intense debate in the literature on whether accounting-based or market-based measures of distress risk better predict bankruptcy. GSY use the Expected Default Frequency (EDF) obtained from the Moody's KMV to measure default risk. When EDF is not available, the literature typically estimates the KMV-Merton (1974) model to obtain the probability of default and denotes this probability as the Default Likelihood Indicator (DLI).[10] I follow this convention and estimate the equity price-implied probability of default as my primary measure of distress risk.[11]

Several modeling choices made by Moody's KMV are proprietary information and not available publicly. Nevertheless, Bharath and Shumway (2004) find that DLI and EDF are highly correlated. For this reason, this study does not perfectly replicate the findings of GSY; however, as discussed shortly, I still generate a stock return pattern very similar to theirs, suggesting that any potential bias arising from the difference in estimation procedures is not consequential. The key input of the estimation is the strike price, which is item34 plus half of item9 from the Compustat annual tape. To avoid problems related to reporting delays, I do not use the book value of debt until six months have elapsed from the end of the previous year. I follow GSY and compute the time-

[10] DLI has been used in Bharath and Shumway (2004), Vassalou and Xing (2004), and Da and Gao (2007). See Bharath and Shumway (2004) for the estimation algorithm.
[11] Major results are not altered when accounting-based variables are used to measure distress risk.

weighted average DLI over the previous six months (*t-5* to *t*) as the measure of distress risk in month *t*.

1.2 Sample Construction

I construct two samples in this study: full sample and bond sample. The full sample includes all Compustat nonfinancial firms having common stocks in the CRSP database from 1970 to 2006 with positive book equity values. The full sample is split into two sub-samples based on whether the firm has public debt. I rely on the Fixed Income Securities Database (FISD, 2006) to identify firms with bonds outstanding from 1975 to 2006. The sample period starts from 1975 because the number of firms with bonds outstanding in the FISD became large enough to conduct a sub-portfolio analysis at that time. Firms without bonds outstanding include firms in the full sample but not in the FISD (2006). For a given month, I require a firm to simultaneously have a distress measure, stock information in CRSP, and accounting information in Compustat.

I also construct a small sample, the bond sample, which includes firms with valid bond trades from 1994 to 2006. The sample period is limited by bond data availability. The primary bond databases are large panel datasets from FISD, the National Association of Insurance Commissioners (NAIC, 1994-2003), and the Trade Reporting and Compliance Engine (TRACE, 2002-2006). (See the appendix for data cleaning procedures used.)

The full sample (Jan. 1970-Oct. 2006) and the sub-sample of firms with bonds outstanding (Jan. 1975-Oct. 2006) have 1,538,898 and 259,208 firm-month observations, respectively. The bond sample has 54,713 (43,168) firm-months with valid yield spreads (bond returns). Summary statistics for the DLI measure are reported in Table 1. The average DLI measures in the full sample, the sub-sample of firms with bonds outstanding, and the bond sample are 5.61%, 4.14%, and 3.07%, respectively. Firms that have issuance in the bond market have better credit quality.

1.3 Yield Spreads and Stock and Bond Returns

In each month *t*, I sort firms in the full sample, firms with bonds outstanding, and firms without bonds outstanding into quintiles according to their distress measures.[12] I compute yield spreads for portfolios of firms in month *t*, and skip one month to month *t+2* to compute stock and bond returns to avoid potential liquidity issues in the stock and bond markets. I then compute the mean and *t*-statistic of the time-series average of portfolio yields and returns.

I follow the literature to compute monthly returns for stocks that are delisted from CRSP.[13] To isolate the effect of distress risk on stock returns from other characteristics, I follow GSY and adjust the returns of each stock by subtracting the returns of a

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[12] I also sort all firms in the full sample into five quintiles and form portfolios for each of the three samples, respectively, based on the full sample sort; *i.e.*, a firm will always stay in the same DLI quintile whether it has bonds outstanding or not. This alternative sorting scheme leads to similar results, which are not reported for brevity.

[13] Specifically, if a stock is delisted during a month and the delisting returns are available on the CRSP tape, the delisting return is added to the CRSP monthly return. If the delisting return is missing and has a performance related delisting code (500, 520-584), then the delisted return is assumed to be a -0.30.

benchmark portfolio that matches the stock's size, book-to-market ratio, and momentum. This methodology is from Daniel, Grinblatt, Titman, and Wermer (1997), and the results are reported under the label "DGTW returns" in the paper.

A typical corporate bond does not trade every day. Therefore, yield spreads and bond returns are calculated using only those days on which trades actually take place.[14] (See the appendix for the computation of yield spreads and bond returns.) To isolate the effect of distress risk on bond returns from other factors, I adjust bond returns by the Merrill Lynch monthly index returns (obtained from Bloomberg) matched in rating and years to maturity. According to Altman (1991), this adjustment procedure is essentially computing the residual returns by taking into consideration the market-wide systematic risk and the opportunity costs that the bond investors would otherwise earn in the bond market index. For brevity I only report index-adjusted returns. The main results remain unchanged for raw bond returns. For firms with multiple issues, I average yield spreads and (raw and adjusted) bond returns across issues using the offering amount as weights.[15]

To compute raw (and adjusted) firm returns, I average the raw (and adjusted) stock and bond returns using the market value of total interest-bearing debt (Item9+Item34+Item206) and the market value of equity as weights. The market value of total debt is estimated by multiplying the book value of the total debt by a value-weighted average of the ratio of market price to book value of each of the firm's traded bonds using the offering amounts as weights.

[14] There is a potential concern about the data selection bias. This issue is addressed in Section 3.7.
[15] Using the market value of each issue as weights yields similar results.

2. EMPIRICAL EVIDENCE: DEFAULT RISK AND RETURNS

Table 2 reports the distress risk premia, which are essentially the returns of long-short portfolios that go short the 20% of firms with the lowest DLI and long the 20% of firms with the highest DLI. As reported in prior studies, in the full sample, there is a significant and negative relationship between distress risk and DGTW returns, indicating that the negative relationship between distress risk and stock returns is above and beyond the known effects of size, book-to-market ratio, and momentum. I also report the Fama-French four factor alphas for equal- and value- weighted portfolios. Consistent with Campbell *et al.* (2006), correcting for risk using the Fama-French factor model worsens the anomalous poor performance of distressed stocks.

I also examine the distress risk premia in stock returns for firms with and without bonds outstanding separately (Table 2, Panels B and C). For firms with bonds outstanding, the negative relationship is insignificant for value-weighted portfolios, but is significant for equal-weighted portfolios. This evidence helps to rule out the possibility that the nonexistence of the shareholder advantage effect on stock returns for firms with bonds outstanding, as discussed shortly, is just simply because in the first place the negative anomaly does not exist among these relatively large firms. The negative relationship between distress risk and DGTW returns, either equal- or value-weighted, is always significant for firms without bonds outstanding. This is consistent with Campbell *et al.* (2006) that the underperformance of distressed stocks is considerably stronger among small stocks since firms without bonds outstanding have a relatively small equity size.

In Panel D of Table 2, I report distress risk premia in stock and bond returns for firms in the bond sample. Distress risk premia in stock returns are insignificant, but the relationship between DLI and yield spreads is significant and positive for both equal- and value- weighted portfolios. Panel D also reports a positive relationship between distress risk and bond returns. The difference in index-adjusted bond returns between high and low DLI firms is 44 bps if equally weighted, while the difference lacks significance if value weighted. The difference in firm returns, either equal- or value-weighted, is insignificant.

This study attributes the entire observed yield spread to credit risk premia and thus the difference in yield spreads between issues of distressed firms and issues of safe firms to distress risk premia in bond returns. The observed yield spreads may be explained by other factors such as expected default loss, tax premia, liquidity premia, and jumps.[16] Relative to safe bonds, distressed bonds have higher coupon rate and higher expected probabilities of default and thus may require higher tax premia and expected default loss premia. However the difference in these premia between distressed and safe bonds may be of less importance relative to the difference in liquidity premia. Similarly, one might also argue that high returns for distressed bonds are not compensation for distress risk but just a manifestation of liquidity premia. To mitigate this concern, I compare the trading frequency and trading volume between bonds of safe firms and bonds of distressed firms

[16] Elton, Gruber, Agrawal, and Mann (2001), Delianedis and Geske (2001), and Huang and Huang (2003).

and find that distressed bonds are not traded less frequently than safe bonds.[17] Illiquid bonds may have generated extremely high yield spreads and returns. For this reason, I apply several different cutoffs to the monthly observations of yield spread (5% to 25%) and bond return (5% to 10%) as a robustness check. The main results are not changed. In the regression analysis to be discussed shortly, I include offering amount and bond age as additional regressors to control for the liquidity factor. The coefficients on distress measures remain significant and positive. While it might be impossible to completely mitigate the potential concern regarding liquidity premia, the positive distress risk premia in bond returns appear to extend beyond any illiquidity effect.

In summary, we observe a significant and negative relationship between distress risk and stock returns but a significant and positive one between distress risk and bond returns and distress risk and yield spreads. An interesting question is whether the difference in distress risk premia in stock and bond returns could be explained by the conflict of interest hypothesis. It is possible that the significant potential for wealth redistribution due to shareholder advantage in distressed firms might lower required stock returns but increase required bond returns. This possibility is examined in the next section.

[17] The time-series average of the monthly median (mean) number of trades and number of trading days is 8.37 (14.96) and 3.16 (3.64) for issues of the riskiest quintile of firms. These numbers are 4.56 (8.25) and 2.57 (3.22) for issues of the safest quintile of firms. Using volume to measure liquidity, the difference is insignificant.

3. SHAREHOLDER ADVANTAGE EFFECT AMONG FIRMS WITH BONDS OUTSTANDING

3.1 Hypothesis Development

In this study, I develop two hypotheses based on the conflict of interest hypothesis. I argue that if shareholders' strategic actions lead to a significant potential for rent extractions from debtholders to shareholders, this potential should have a significant effect on both stock and bond prices *ex ante*. Bargaining power and liquidation costs are two crucial variables that influence shareholders' strategic behavior; the latter measures the size of liquidation surplus, and the former determines the division of this surplus. Firms with bonds outstanding are relatively large and thus have strong shareholder bargaining power and a high potential for deviations from absolute priority (Betker (1995)). Relative to their counterpart firms without bonds outstanding, these large firms are less subject to close monitoring by private creditors like banks (Diamond (1991)). This close monitoring might severely weaken shareholders' bargaining power in distressed firms. Because bank lenders are generally secured, they have little incentive to make concessions when borrowers experience financial distress. James (1995, 1996) report that banks rarely make unilateral concessions unless their claims are impaired. Empirical work by Asquith, Gertner, and Scharfstein (1994), Betker (1995), Gilson (1997), and Helwege (1999) also finds that banks slow down distressed renegotiations and write down less debt outside of Chapter 11. This evidence suggests that, compared to bond investors, debtholders in firms with no public debt have few losses in debt renegotiations and should thus face relatively less risk of strategic default. Moody's Investors Service (1999) reports that firms with debt entirely privately financed recover a median value of 78.4% of total claims. This contrasts with 50.6% for firms that have some public debts. This evidence is consistent with the idea that public bonds are more susceptible to default risk than private debt. Such vulnerability should magnify shareholders' opportunistic incentives in firms with public debt when these firms experience financial distress.

Hypothesis 1 The s*hareholder advantage effect on stock returns is more evident for firms with bonds outstanding than for firms without bonds outstanding.*

The conflict of interest hypothesis is consistent with the efficient market hypothesis. In this framework, we should observe a positive relationship between distress risk and bond returns and distress risk and yield spreads. Structural bond pricing models with debt renegotiations suggest that when creditors have little bargaining power, a large part of the spread may be due to the risk of strategic default. Accordingly, shareholders' strategic actions should depress bond prices *ex ante* and increase required bond returns and yield spreads. I argue that while both distress risk and shareholder advantage negatively affect bond prices *ex ante*, the negative impact of either factor on bond prices is exacerbated by the other factor. Intuitively, default, especially strategic default, is a relatively less important determinant of bond values for safe bonds than for distressed bonds. For firms with high DLI, shareholders' incentive to default strategically is higher as shareholders have little to lose when default is imminent anyway. Shareholder advantage and distress risk should thus reinforce each others' impact on yield spreads and bond returns.

Hypothesis 2 *For a given probability of default, yield spreads and bond returns increase with shareholder advantage, and this pattern is more evident for firms with high DLI. The positive relationship between DLI and yield spreads and DLI and bond returns is more evident for firms with strong shareholder advantage.*

3.2 Measuring Shareholder Advantage

The corporate finance literature has identified many firm-specific factors that determine the bargaining positions of different claimholders in debt renegotiations and affect the nature of reorganizations and deviations from absolute priority. These firm-specific variables are thus good proxies for shareholders' strategic actions. The essence of this study is to relate these strategic variables to *ex ante* asset prices. This study follows GSY and constructs four variables as a primary measure of shareholder advantage. According to the authors, firms with a large asset size and low R&D expenditures have strong shareholder bargaining power. Moreover, high industry Herfindahl index and low asset tangibility (*i.e.*, large liquidation costs) exacerbate bondholders' vulnerability to default risk. GSY obtain the equity price implied asset size from Moody's KMV. To be comparable to their study, I estimate the KMV-Merton (1974) model and obtain asset size every month. R&D expenditures, industry Herfindahl index, and tangible assets are computed in the fiscal year that ends in year *t* and applied to the one-year period starting from July of year *t+1* (see the appendix for additional details).[18]

Panel A of Table 3 compares shareholder advantage across the full sample and the sub-sample of firms with and without bonds outstanding. In each month *t*, I first compute the cross-sectional median of strategic variables for firms in each of the three samples. I then compute the time-series mean of the monthly medians for that sample. Firms with bonds outstanding have a higher leverage ratio and a larger asset size, as well as lower R&D expenditures and asset tangibility, than firms without bonds outstanding. Overall, this evidence suggests that firms with bonds outstanding have stronger shareholder advantage than firms without bonds outstanding. We would thus expect to observe greater evidence of shareholder advantage effect on stock returns for firms with bonds outstanding, as formulized in Hypothesis 1.

3.3 Sub-Portfolio Analysis in the Full Sample

Table 3 Panel B reports the results of sub-portfolio analysis in the three samples. To examine whether stock returns decrease with shareholder advantage for a given default probability, in each month *t*, I sort firms in each of the three samples into five DLI quintiles, and then within each quintile of DLI, I sort firms into three terciles according to one of the characteristics that proxy for shareholder advantage.[19] I then skip one month

[18] I also use other firm-specific variables as a proxy for shareholder advantage. See Section 3.7.

[19] This study follows Campbell *et al.* (2006) and sequentially sorts firms into sub-portfolios to conduct tests. DLI is highly correlated with some sorting variables such as asset size and leverage ratio, and firms with bonds outstanding and with bon trades (the bond sample) cluster in one or two sub-portfolios if

to month *t+2* and compute value-weighted monthly portfolio returns. For each portfolio I compute the time-series average of monthly DGTW returns to control for the known effects of size, book-to-market ratio, and momentum.

The conflict of interest hypothesis predicts lower returns for firms with stronger shareholder advantage in distressed firms ("High DLI"). It also predicts a negative relationship between DLI and returns for firms with strong shareholder advantage ("High ADV"). To test these two predictions, in Panel B1 of Table 3, I analyze the "slope" of the relationship between stock returns and DLI—*i.e.*, the difference ($ret^{high\ DLI}$ - $ret^{low\ DLI}$) between the returns in the high and low DLI quintiles—for both column "High ADV" and column "Low ADV." Similarly, in Panel B2, for each quintile of DLI, I take the difference ($ret^{high\ ADV}$ - $ret^{low\ ADV}$) between the returns in the high and low terciles of each shareholder advantage (ADV) group and report such differences for the lowest DLI quintile (the "Low DLI" column) and for the highest DLI quintile (the "High DLI" column). The last column "High-Low" reflects the difference between the slope in the high and low ADV cases and the high and low DLI cases.

In the full sample, I confirm the findings of GSY on the shareholder advantage effect on stock returns. For firms with high DLI, stock returns significantly decrease with shareholder bargaining power. The relationship between distress risk and stock returns is significant and negative for firms with stronger shareholder advantages, *i.e.*, firms with low R&D expenditures, high Herfindahl index, and low asset tangibility. Like GSY, the

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independently sorted. This extremely uneven distribution of sample firm observations makes the sub-portfolio analysis less sensible. Nonetheless, if firms are independently sorted, major inferences still hold except that the asset size effect is not observed in any sample.

statistical significance is lacking for the slope in the relationship between stock returns and DLI within each asset size sub-sample. However, the divergence in the relationship—the difference in slopes ("High-Low")—is –0.66%, statistically significant at the 1% level. These results are broadly consistent with the conflict of interest hypothesis.

Hypothesis 1 predicts that the shareholder advantage effect on stock returns should be more evident for firms with bonds outstanding. This prediction is not confirmed in the data, however; the shareholder advantage effect is actually not observed in this sample. It appears that shareholder advantage does not make a large contribution to the cross-sectional variation of stock returns for firms with public debt. The stock return pattern in the full sample consistent with the conflict of interest hypothesis is mainly driven by firms without bonds outstanding. The differences in distress risk premia in stock returns ("High-Low") between strong and weak shareholder advantage are always significant and negative for firms without bonds outstanding (except for R&D ratios). Overall, Hypothesis 1 is rejected.

Since firms with bonds outstanding are relatively large in size, it is possible that insufficient cross-sectional variation in the strategic variables may account for the absence of the shareholder advantage effect in this sample. Although it is not clear why the shareholder advantage effect should not exist among large firms, I nevertheless explore this aspect. I find that the variation in strategic variables across sub-portfolios is still very large for firms with public debt and should not by itself lead to the nonexistence of shareholder advantage effect on stock returns.

3.4 Sub-Portfolio Analysis in the Bond Sample

To have a complete understanding of the significance of the shareholder advantage for asset prices, I test Hypotheses 2 in a joint framework of stock and bond markets. In each month *t*, I first sort firms with bonds outstanding into three DLI triplets, and then within each DLI triplet, I sort firms into three triplets using proxies for shareholder advantage.[20] I record the value-weighted yield spreads in month *t* and returns in month *t+2*. Table 4 presents the "slope" of the relationship between DLI and yield spreads and DLI and returns.

It is clear that distress risk has a significant effect on yield spreads. There is a significant and positive relationship between DLI and yield spread, regardless of shareholder advantage. This is consistent with the view that the bond market is efficient in impounding distress information and bond investors demand a positive premium for distress risk. The relationship between DLI and bond returns is also positive, though only statistically significant for firms with low asset tangibility and low industry Herfindahl index.

Hypothesis 2 predicts that the positive relationship between DLI and bond returns and DLI and yield spread should be more evident for firms with strong shareholder

[20] Sorting firms with bonds outstanding into sub-portfolios but only recording yields and returns for firms with valid bond trades is done to avoid the look-ahead bias of not every firm in the formation month having valid yield spreads and bond returns in the holding month. To mitigate a potential concern that a small number of observations drives the results, each of the nine sub-portfolios must have at least five firms in a particular month for that month to be included in the calculation of the time-series average. Five is an arbitrary number, and using zero or ten does not change the results. The minimum number of months included in the computation of the time-series average is 100, 115, 113, and 107 for asset size, R&D, Herfindahl index, and asset tangibility, respectively.

advantage. This prediction is not supported in the data: the divergence of the slope (the "High-Low") is not significantly positive for either yield spreads or bond returns. In fact, using asset size and asset tangibility to measure shareholder advantage, the divergence is significant and negative for yield spreads, presenting evidence against Hypothesis 2. Hypothesis 2 also predicts that yield spreads and bond returns increase with shareholder advantage for a given default probability, and this pattern should be more evident for firms with high DLI. However, there is no supporting evidence for this prediction, either. Counter to Hypothesis 2, there is a significant and negative relationship between yield spreads and asset size for firms with high DLI.

3.5 Regression Analysis on Stock and Bond Returns

A potential concern with the analysis presented above is that the relatively small number of firm-month observations in the sub-sample of firms with bonds outstanding might reduce the power of tests. One might also concern that for the sub-portfolio analysis in the bond sample, the smaller number of firms in the formation month than in the holding month may result in unknown bias. For these reasons, I conduct a Fama and MacBeth (1973) regression analysis on stock and bond returns (Table 5) and a fixed effects regression analysis on yield spreads (Table 6). Regression analysis makes use of all available firm-month observations and could potentially provide a more comprehensive view of cross-sectional differences, thus offering further insight into the effect of shareholder advantage on the relationship between distress risk and returns.

I first define a dummy variable, *bond*, for firms with bonds outstanding in month *t*, and regress monthly stock returns in month *t+2* on a set of firm characteristics. I then average the time-series of regression coefficients and calculate corresponding *t*-statistics adjusted by the method of Newey and West (1987). Rather than using DLI and proxy variables directly, I follow GSY and use the rank-transformed variables as regressors to mitigate the problem caused by skewed distributions. In particular, I include the rank of DLI normalized between 0 and 1, the rank of shareholder advantage proxies, and the interaction terms of DLI with these proxies.[21] To capture the difference between firms with and without bonds outstanding, I include the interaction terms of the *bond* dummy with the above variables. The set of independent variables also contains characteristics such as beta, book-to-market ratio, and momentum measured by past six-month returns, which are known to affect stock returns.[22] The main test of Hypothesis 1 relies on examining the dummy interaction variables, *i.e.*, *Bond* x *DLI* x shareholder advantage proxies.

Results are shown in Table 5 Panel A. Model 1 of Panel A is the basic benchmark known in the literature, and the inclusion of DLI does not qualitatively affect the effects of other characteristics (Model 2). Consistent with the analysis in Section 2, the coefficient on DLI is significant and negative. For firms without bonds outstanding (*i.e.*, where the bond dummy equals zero), I confirm previous findings of the shareholder

[21] To be comparable to GSY, all rank-transformed variables are obtained by sorting firms in the full sample in month *t* into five DLI quintiles and, independently, into ten deciles of shareholder advantage. The results are similar if these variables are rank-transformed by a sequential sort.

[22] The equity market capitalization is excluded from the regression because it is highly correlated with the asset size.

advantage effect on stock returns.[23] Specifically, the interaction terms of DLI with shareholder advantage in Models 3 to 7 are all statistically significant with desired signs, representing a conditional dependence of stock returns on default probability. For example, Model 4 implies that conditional on a given DLI, a decrease in R&D lowers stock returns.

Hypothesis 1 predicts that the coefficients on the dummy interaction variables are statistically significant with the same signs as those on the corresponding interaction terms of DLI with shareholder advantage. Consistent with the sub-portfolio analysis, this hypothesis is rejected at conventional significance levels (Models 3-7). For example, the coefficient on *Ln (AVL)* x *DLI* is significant and negative (t=-3.89), but the coefficient on the dummy interaction variable *Bond* x *Ln (AVL)* x *DLI* is statistically significant with a positive sign (t=2.77). The potential for rent extraction due to shareholders' strategic actions does not seem to play an important role in shaping the relationship between distress risk and stock returns for firms with bonds outstanding.

Similarly, in Panel B of Table 5, I regress monthly bond returns on asset size, book-to-market ratio, DLI, shareholder advantage, and interaction terms of shareholder advantage with DLI. Consistent with the analysis in Section 2, the loading on DLI is significant and positive (Model 1). Controlling for rating and years to maturity has a minimal effect on the loading of DLI (Model 2). Hypothesis 2 states that distressed firms with a larger asset base have stronger shareholder bargaining power. As a result, one should expect that given distress risk, bond returns increase with asset size. However,

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[23] In an unreported regression analysis in the full sample, I obtain similar results to the findings of GSY.

Model 3 reports a significant and negative coefficient on the interaction term of *Ln (AVL)* with DLI. Other predictions of Hypothesis 2 are not supported in the regression analysis, either.

3.6 Regression Analysis on Yield Spread

If the potential for rent extraction due to shareholder advantage in distressed firms is significant, this potential should be reflected *ex ante* on yield spreads and thus affect the relationship between distress risk and yield spreads. The literature (*e.g.*, Bharath and Shumway (2004) and Campbell and Taksler (2003)) has built a well-accepted framework to conduct regression analysis on yield spreads. I augment these models with additional strategic variables as proxies for shareholder advantage. The set of controlling variables includes bond ratings, a dummy for high yield bonds, equity volatility, maturity, offering amount, the closest benchmark interest rate, coupon, dummies for interest coverage ratios, book and market leverage ratios, profitability, and month and industry dummies. The dependent variable is the monthly yield spread for each issue in the bond sample. Summary statistics for independent and dependent variables are reported in Table 6 Panel A. While the distribution of these variables is comparable to prior studies, the average spread is about 189 bps, which is slightly greater than those reported in previous studies. [24]

In Panel B of Table 6 I report the results of regressing monthly bond yields with issuer and month fixed effects. The main test of Hypothesis 2 relies on examining the

[24] While this study uses NAIC and TRACE from 1994-2006, Campbell and Taksler (2003) uses only NAIC from 1994-1999, and Bharath and Shumway (2004) use the Lehman Brothers Fixed Income Database (LBFI) from 1980-1997. Also different from prior studies is that my study includes all junk bonds while Campbell and Taksler (2003) exclude them.

interaction term of the DLI measure with shareholder advantage. Model 1 is the base model. In Model 2, the DLI measure is added as an additional regressor. All coefficients have similar signs and statistical significances to those reported in the base cases of Campbell and Taksler (2003) and Bharath and Shumway (2004). Consistent with the discussion in Section 2 and the previous studies by Bharath and Shumway (2004) and Berndt, Douglas, Duffie, Ferguson, and Schranz (2005), there is a significant and positive relationship between yield spreads and DLI.[25]

Models 3 to 7 test Hypothesis 2. First, as found in the sub-portfolio analysis, there is a significant and negative coefficient on the interaction term of asset size with DLI (Models 3 and 7). Recall that in Panel B of Table 5 we also have a significant and negative coefficient on this interaction term when bond returns are the dependent variable. These results are inconsistent with Hypothesis 2, which states that for a given default probability, a larger asset size increases required bond returns and yield spreads. This evidence suggests that while large firms have strong shareholder bargaining power, this bargaining power might not be effectively exercised against bondholders. All other coefficients on the interaction terms of DLI with the shareholder advantage proxies are not significant (except for the Herfindahl index in Model 7), suggesting that the effect of shareholder advantage on the relationship between distress risk and yield spreads is immaterial.

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[25] The coefficients on DLI (Models 2–7) appear to be too small. For example, the difference in yield spreads between the safest bonds and riskiest bonds is only 51.15 bps (Model 2). However, one should interpret these coefficients as capturing the explanatory power of DLI conditional on being in a particular rating class since bond ratings and the junk bond dummy capture a large fraction of the variation in spreads.

Overall, strong shareholder bargaining power in distressed firms does not create a significant potential for rent extraction from bondholders to shareholders. Recently, Davydenko and Strebulaev (2006) use a different set of variables to proxy for shareholders' strategic actions and find that strategic debt service has a statistically significant but economically minimal effect on yield spreads. Huang and Huang (2003) find that for most bonds credit risk, including strategic debt service, explains only a small part of the spread when estimates of expected bond losses are based on historical default data. In a broad sense, my results are consistent with these findings.[26] I extend the literature by further showing that shareholders' strategic actions do not have a significant impact on bond returns or the relationship between distress risk and yield spreads (bond returns).

3.7 Robustness Checks and Limitations of Research

As mentioned earlier, I only compute yield spreads and bond returns for firms with valid bond trades from 1994-2006 (*i.e.*, bond sample). During this time period, 42.5% and 35.5% firm-month observations with bonds outstanding have valid yield spreads and bond returns in the bond sample. A potential concern is that the results of this study may be driven by a possible data selection bias. If bond trading cannot be treated as a random event, that is, if firms in the bond sample are not representative of firms with bonds

[26] My findings are also consistent with Acharya, Huang, Subrahmanyam, and Sundaram (2006) that strategic debt-service may not have a significant effect on yield spreads and even decrease yield spreads in some cases.

outstanding, the findings based on the bond sample may not be generalized. Although it is still not clear what firm-specific information may trigger bond trading, the literature typically finds that stock and bond markets are equally informationally efficient (Hotchkiss and Ronen (2002) and Kwan (1996)). This evidence provides the justification for the use of a matching algorithm in this study. Specifically, I compute stock returns in the bond sample by matching stock trading to bond trading on a month-to-month basis.[27] That is, the monthly stock return observations included in the bond sample are only for firm-months with valid bond returns. The advantage of this approach is that anything that affects bond prices in the bond trading month should also affect stock prices so that the potential bias arising from using bond data that are not regular in monthly frequency is minimized.

Nevertheless, I conduct additional exercises for robustness checks to mitigate this data selection concern. First, I compare shareholder advantage between firms with bond trades and firms without bond trades, and do not find significant differences. Second, I run the Heckit (Heckman (1976)) model to conduct a regression analysis on returns. Use of the two-step Heckman procedure allows us to obtain consistent estimates for the effect of shareholder advantage on bond returns. A probit model, in which the dependent variable equals one only if the firm is in the bond sample and zero otherwise, is first used to estimate the inverse Mill's ratio (*IML*). The second step is to estimate the Fama-Macbeth OLS regression with the *IML* included as an explanatory variable. The time-series average of the coefficient on the *IML* is not significant, and the major results in

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[27] Matching on a day-to-day basis yields similar results, which are not reported.

Table 5 are qualitatively unaltered. This evidence suggests the absence of a data selection problem. It is also noted that my regression results on yield spreads (Table 6, Models 1-2) are basically comparable to Bharath and Shumway (2004).[28] This comparability suggests that the results based on firms in the bond sample (1994-2006) can be generalized to firms with bonds outstanding (1975-2006).

Several other variables have been documented in the literature to be positively associated with the likelihood and the level of potential deviations from the absolute priority. These variables include institutional ownership (obtained in the end of last quarter from the 13f database), insider ownership (from ExecuComp), market-to-book asset (equity) ratio, and the non-fixed asset ratio (1-Item7/Item6). As a robustness check, I use these variables to proxy for shareholder advantage and still do not find a significant potential for rent extraction from bondholders to shareholders.

One limitation of this study is that failure to observe the shareholder advantage effect on asset prices for firms with bonds outstanding might be due to a potential endogeneity problem. Chemmanur and Fulghieri (1994) and Berlin and Mester (1992) show that in equilibrium, firms with relatively a lower probability of being in financial distress issue public bonds.[29] If so, firms with bonds outstanding may not be a random sample with respect to the probability of strategic default. For this reason, I limit the sub-sample of firms with public debt to firms without issuing any bonds within the past five years to conduct a robustness check. By construction, this sample is relatively less subject to the

[28] The authors use the monthly bid price reported in the LBFI database from 1980-1997 to compute yield spreads.
[29] For supporting empirical evidence, see Denis and Mihov (2003).

above endogeneity problem. The number of firms with bonds outstanding is reduced to 55,823 firms, of which 11,495 firms have yield spreads and 4,674 firms have bond returns. For this small sample of firms, I still find no significant effect of shareholder advantage on stock returns and yield spreads.

In summary, the shareholder advantage effects on stock and bond returns are not observed for firms with bonds outstanding, suggesting the absence of a significant potential for wealth extraction from bondholders due to shareholders' strategic actions in distressed firms. It should be pointed out that the quantitative impact of strategic renegotiations on yield spreads and returns could be actually higher than found in this study, because the proxies used here are just noisy measures of shareholder advantage. Still, the potential for wealth extraction seems to be considerably less than those predicted for extreme cases in theoretical models such as Anderson and Sundaresan (1996) and GSY (2006). My findings are more consistent with the assumption that bondholders on average have significant bargaining power, which partially or even completely offsets the negative impact of liquidation costs on bond prices.

4. SHAREHOLDER ADVANTAGE EFFECT FOR FIRMS WITHOUT BONDS OUTSTANDING

Given that the potential for rent extraction from bondholders to shareholders is insignificant, an interesting question is why we observe a stock return pattern that is consistent with the conflict of interest hypothesis for firms without bonds outstanding. One possibility is that firms with public debt are different from firms that rely on commercial banks as their sole source of debt financing. The dispersed nature of bondholders may effectively prevent successful debt renegotiations.[30] Firms without bonds outstanding are likely to have concentrated bank lenders who are well informed, sophisticated, and easily accessed and might not be subject to the holdout problems common to the dispersed public bondholders.[31] Commercial banks may thus be more sensitive to shareholders' strategic actions, and then the shareholder advantage effect on stock returns may only be observed for firms without bonds outstanding.

I argue that if the potential for rent extraction due to shareholder advantage in distressed firms is significant, the significance of this potential is likely to be observed for firms with high financial leverage and few renegotiation frictions. The intuition is that for firms with very little debt, the potential for shareholders to extract rent is very limited. In an extreme case, for full equity firms, one should not observe any shareholder advantage effect. The literature has also emphasized the impact of renegotiation frictions

[30] Empirical work by Brown, James, and Mooradian (1993), Gilson, John, and Lang (1990), Asquith, Gertner, and Scharfstein (1994), and James (1995, 1996) shows evidence to support this argument.

[31] Anderson and Sundaresan (1996) and Mella-Barral (1999) show that shareholders, when faced with a single creditor, can strategically obtain concessions by threatening to walk away.

on the strategic interaction between shareholders and debtholders (Francois and Morellec (2004) and Hege and Mella-Barral (2005)). High renegotiation frictions prevent claimholders from renegotiating successfully *ex post* and thus make strategic default less likely to happen *ex ante* (Davydenko and Strebulaev (2006)). Gertner and Scharfstein (1991) and Berglof and von Thadden (1994) show that short-term lenders rarely renegotiate or forgive debt when the concessions accrue to subordinate long-term creditors. Davydenko and Strebulaev (2006) find that the dispersion of equityholders hinders renegotiations due to the coordination problem among shareholders. Accordingly, renegotiation frictions should be higher for firms with higher short-term debt ratios or more different shareholders. I follow the literature and use the proportion of short-term debt in the debt structure (Item34/ (Item9+Item34)) and the normalized number of shareholders (the number of different institutional shareholders scaled by the market value of the firm's equity) to proxy for renegotiation frictions.

I divide firms without bonds outstanding into two groups of equal size by financial leverage and renegotiation costs (book leverage ratio and short-term debt ratio) and then examine the shareholder advantage effect for firms in each of the two groups, respectively.[32] Except for the Herfindahl index, the shareholder advantage effect does not increase with leverage or decrease with short-term debt ratio (Table 7). For example, among firms with low book leverage, the divergence of the relationship between asset size and stock returns across distressed and non-distressed firms is –1.06%, which is statistically significant at the 1% level. For firms with high book leverage, this number is

[32] Using market leverage ratio and the normalized number of shareholders yields similar results.

an insignificant –0.84%. Similarly, the divergence is –1.57% for firms with low short-term debt and –2.19% for firms with high short-term debt, both significant at the 1% level. In unreported results, for firms in the full sample, I also find that the shareholder advantage effect on stock returns is not stronger for firms with higher financial leverage or fewer renegotiation frictions. Together, these findings suggest the absence of a significant potential for wealth extraction due to shareholder advantage in distressed firms.

5. MARKET MISPRICING AS AN ALTERNATIVE EXPLANATION

The above findings suggest that shareholder advantage is unlikely to be the main reason behind the inability of traditional risk-return models to explain the negative relationship between distress risk and stock returns. As proposed in the literature, an alternative explanation is stock market mispricing. But if the stock market misprices distressed equities, why do rational investors fail to arbitrage the distress anomaly? Campbell *et al.* (2006) suggest that one plausible reason is the limits of arbitrage. I hypothesize that if the negative relationship between distress risk and stock returns is due to market mispricing, the mispricing is more likely to happen for firms that are unusually expensive or difficult to short, *i.e.*, firms that have high idiosyncratic volatility, high trading costs, and less liquidity.

To specialized arbitrageurs, idiosyncratic volatility of the stocks in their portfolio is of greater concern than systematic volatility, so that high idiosyncratic volatility will deter arbitrage activities (Shleifer and Vishny (1997) and Ali, Hwang, and Trombley (2003)). To obtain a measure of expected idiosyncratic volatility, I regress daily returns on the CRSP value-weighted index returns over the six-month period immediately preceding the holding month and compute the variance of the residual term.[33] The data is available from 1970 to 2006 in monthly frequency.

When securities are mispriced, transaction costs limit the extent to which investors aware of the mispricing can take advantage of it and eliminate it. Securities with higher

[33] I obtain similar results if regressing over a three-month period.

transaction costs are therefore likely to exhibit greater mispricing. I follow the literature and use the historical bid-ask spread, effective bid-ask spread (Roll (1984)), share price, and the frequency of zero daily returns as measures of transaction costs. Illiquid securities might be more likely to be mispriced since new information cannot be impounded into stock prices efficiently. I use the Amihud illiquidity ratio (2002), Amivest liquidity ratio (2002), Pastor and Stambaugh (2003) Gamma, the proportion of prices reported as quoted midpoints, and the frequency of zero daily volume as measures of liquidity. The average monthly bid-ask spread is computed using the NYSE Trade and Quote Database (TAQ) in month *t* from 1993 to 2006; stock price is obtained from CRSP in month *t* from 1970 to 2006; the proportion of prices reported as quote midpoints, the frequency of zero daily returns, and the frequency of zero daily volume are estimated from CRSP in year *t* and applied to year *t+1* from 1970 to 2006. All other measures are obtained from Hasbrouck (2005) and available in annual frequency from 1970 to 2003 with estimation obtained in year *t* and applied to year *t+1*.

Since overpriced stocks below $5 are rarely shorted by professional arbitrageurs, I focus on stocks with price greater than $5 to avoid potential microstructure issues associated with penny stocks. I sort these stocks in month *t* into three terciles based on trading costs, liquidity measures, and idiosyncratic volatility, respectively, and then within each tercile, I sort firms into five quintiles of distress risk. I then compute distress risk premia in stock returns in month *t+2* for firms in each of the three terciles.

The results are reported in Table 8. The relationship between distress risk and DGTW returns is significant and negative for firms with high idiosyncratic volatility (-

0.48%), high trading costs (from -0.22% to -0.53%), and less liquidity (from -0.29% to -0.49%). The divergence in distress premia across firms with high and low idiosyncratic volatility is –0.43%, which is statistically significant at the 10% level. These findings are broadly consistent with the market mispricing hypothesis.

6. CONCLUSION

This study applies a joint framework to test the conflict of interest hypothesis versus the market mispricing hypothesis in explaining the negative relationship between distress risk and stock returns. The negative relationship between distress risk and stock returns remains significant for firms with and without bonds outstanding. I document a significantly positive relationship between distress risk and bond returns and distress risk and yield spreads. For firms in the full sample and firms without bonds outstanding, stock returns decrease in asset size and Herfindahl index but increase in R&D and asset tangibility for a given probability of default. This pattern has been argued in prior studies to be consistent with the conflict of interest hypothesis that the significant potential for rent extraction due to shareholder advantage in distressed firms helps lower returns of distressed equity. However, I do not find such a pattern for firms with bonds outstanding, a sub-sample of firms that have relatively strong shareholder advantage. Moreover, I find no evidence that the values of distressed firms' bonds suffer significantly from shareholder advantage *ex ante*. In addition, the potential for rent extraction due to shareholder advantage in distressed firms is not more evident for firms with high financial leverage or few renegotiation frictions. These findings suggest that shareholder advantage has a very limited impact on stock prices *ex ante* and does not affect distress risk premia in stock returns.

Overall, it appears that stock investors fail to incorporate the negative information about a firm's prospect into stock prices, and that professional arbitrageurs are deterred by high trading costs and idiosyncratic volatilities and fail to eliminate this mispricing. While stock investors are overoptimistic about the possibility of turnaround and thus have not discounted the prices of distressed stocks enough to offset their failure probability, the bond market quickly impounds distress information into bond prices. I conclude that mispricing of distressed stocks, rather than shareholder advantage, is more likely an explanation for the difference in distress risk premia in stock and bond returns.

APPENDIX A

TABLES

Table 1: Summary Statistics of Default Likelihood Indicator (DLI)

The full sample ranges from January 1970 to October 2006 and includes all Compustat nonfinancial common stocks. I rely on FISD (2006) to identify firms with bonds outstanding from January 1975 to October 2006. The bond sample includes firms with bond trades from January 1994 to October 2006. This sample period is due to the bond data availability. Panels A, B, and C report the number of firm years, firm months, the mean, median, and the standard deviation of the Default Likelihood Indicator (DLI) distribution for the full sample, firms with bonds outstanding, and bond sample, respectively. DLI quantities are expressed in percent units.

Month	# Firms	Mean	Median	Std.
Panel A: Full Sample (1970-2006)				
Jan-70	1,485	2.1386	0	7.3007
Jan-73	1,858	2.2343	0	8.2485
Jan-76	3,326	4.5592	0.0101	12.2676
Jan-79	3,299	1.9756	0	7.7365
Jan-82	3,266	4.2578	0.0004	13.1352
Jan-85	3,630	5.0751	0	15.1345
Jan-88	3,693	8.1583	0.0601	17.3502
Jan-91	3,643	14.616	0.1086	26.042
Jan-94	3,912	4.9572	0	15.0065
Jan-97	4,623	5.4725	0	15.5702
Jan-00	4,344	7.6023	0.0075	17.3124
Jan-03	3,632	10.4836	0.0084	22.368
Jan-06	3,229	1.4206	0	7.5994
Total	1,538,898	5.6116	0.0150	14.2363
Panel B: Firms with Bonds Outstanding (1975-2006)				
Jan-76	312	0.8601	0	6.035
Jan-79	374	0.3714	0	2.1559
Jan-82	458	1.6035	0	5.7868
Jan-85	568	4.4409	0	14.935
Jan-88	742	6.8234	0.0419	16.0128
Jan-91	699	12.4142	0.009	24.5061
Jan-94	721	1.4279	0	6.4553
Jan-97	819	3.4533	0	12.7945
Jan-00	938	8.1506	0.0238	18.8765
Jan-03	873	12.8721	0.072	24.9079
Jan-06	904	0.9758	0	5.8487
Total	259,208	4.143	0.0113	11.0089
Panel C: Bond Sample (1994-2006)				
Jan-94	123	0.2378	0	1.0037
Jan-97	173	1.4017	0	6.9187
Jan-00	387	4.0912	0.0025	11.9138
Jan-03	431	8.7269	0.021	20.4703
Jan-06	707	0.873	0	5.5412
Total	54,713	3.0661	0.0047	9.1695

Table 2: Distress Risk Premia in Stock and Bond Returns

At the beginning of each month *t* from January 1970 to October 2006, I sort firms in the full sample (Panel A), without bonds outstanding (Panel B), and with bonds outstanding (Panel C), respectively, into five quintiles based on DLI measures, and then record the yield spreads of these portfolios in month *t*, and stock, bond, and firm returns of these portfolios in month *t+2*, *i.e.*, one month after the portfolio formation. I then compute the time-series mean and corresponding *t*-statistics over the entire sample period. The DLI measure is estimated from the Merton-KMV (1974) model. Also reported are monthly alphas from regressions of excess returns (over risk free rate) on the four (Rm-Rf, HML, SMB, and UMD) FF factors. For firms with bond trades (bond sample), Panel D calculates the yield to maturity on each bond and its spread over the closest benchmark U.S. treasury in a trading day. I average an issue's yield spreads in a particular month to obtain its monthly yield spreads. I also compute average daily log bond returns in a particular month (see the appendix for the methodology) for each issue and then convert them into monthly bond returns. Raw bond returns are adjusted by Merrill Lynch Index returns based on rating and maturity. For firms with multiple issues outstanding, I average spreads and bond returns across issues using the offering amounts as weights. Panels A-D report DGTW adjusted stock returns with the methodology suggested by Daniel, Grinblatt, Titman, and Wermers (1997). The sample period spans from June 1975 to October 2006 due to the availability of the DGTW benchmark portfolio returns. Adjusted firm returns are the weighted averages of DGTW returns and index-adjusted bond returns using the market value of equity and the market value of total interest-bearing debt as weights. The sample period of Panel D spans from January 1994 to October 2006. Both equal-weighted and value-weighted quantities are reported. The High-Low is the difference between a quantity of the high distress group and that of the low distress group, and the *t*-value is the *t*-statistic of this difference. All *t*-statistics are adjusted by Newey-West (1987) with lag 3. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Equally Weighted						Value Weighted					
	Low	2	DLI	4	High	High-Low	Low	2	DLI	4	High	High-Low
A. Full Sample (1970-2006)												
DGTW Returns	0.28	0.09	0.09	0.02	0.21	-0.07	0.12	-0.03	-0.03	-0.05	-0.23	-0.35*
Alpha	0.56	0.13	0.17	0.11	0.34	-0.21	0.21	0.01	-0.03	0.02	-0.19	-0.40**
B. Firms Without Bonds (1975-2006)												
DGTW Returns	0.35	0.11	0.12	0.10	0.33	-0.02	0.14	0.14	0.12	-0.10	-0.15	-0.29*
Alpha	0.66	0.18	0.19	0.18	0.51	-0.15	0.37	0.19	0.07	0.00	-0.14	-0.51***
C. Firms With bonds (1975-2006)												
DGTW Returns	-0.01	0.00	-0.03	-0.20	-0.39	-0.38*	-0.02	-0.06	-0.10	-0.13	-0.13	-0.11
Alpha	-0.02	-0.04	-0.09	-0.15	-0.38	-0.37	0.01	-0.09	-0.05	-0.11	0.14	0.13
D. Bond Sample (1994-2006)												
DGTW Returns	-0.05	-0.05	-0.16	-0.07	0.74	0.79	-0.25	-0.18	-0.08	-0.08	0.05	0.30
Alpha	-0.06	-0.19	-0.12	-0.26	-0.02	0.05	-0.09	-0.36	0.07	-0.08	0.22	0.32
Yield Spreads	135	168	218	284	389	254***	108	130	160	204	282	174***
Raw Bond Returns	0.18	0.24	0.35	0.21	0.82	0.64***	0.06	0.10	0.20	0.15	0.55	0.49*
Adj. Bond Returns	-0.30	-0.24	-0.15	-0.36	0.23	0.53***	-0.44	-0.38	-0.32	-0.31	-0.11	0.32
Adj. Firm Returns	-0.08	-0.11	-0.18	-0.23	0.35	0.43	-0.28	-0.25	-0.19	-0.17	-0.20	0.08

Table 3: Default Likelihood Indicator (DLI) and Stock Returns in Cross Section

Panel A presents the mean of monthly cross-sectional median proxy variables chosen to measure shareholder advantage for firms in the full sample and firms with and without bonds outstanding from January 1975 to October 2006. *AVL* (Asset Size) is the firm's implied market value of assets. *Equity* is market value of stock. *AVL* and *Equity* are measured in millions of dollars at the end of month *t*. *Book Leverage* is (Item9/Item6). *Mkt Leverage* is (Item9+Item34+Item104)/(Item181+Item199*Item25). *R&D* is Item46/Item6, *Hfdl* is the industry sales Herfindahl index, and *Tang* is asset tangibility. These accounting variables (in percentages) are computed in the fiscal year that ends in year *t* and are attributed to the one-year period starting from July of year *t+1*. Panels B1 and B2 present the effect of shareholder advantage on stock returns. At the beginning of each month *t*, I sort firms in the full sample, firms with bonds, and firms without bonds, respectively, into five quintiles based on DLI measures and then, within each quintile, sort firms into three terciles based on the chosen proxy for shareholder advantage (ADV) – Asset size, R&D expenditures, Industry concentration, and Asset tangibility. In month *t+2*, I record the value-weighted DGTW-adjusted stock returns on each of these portfolios and compute the time series mean and corresponding *t*-statistics over the entire sample period (1975-2006). In Panel B1, I report the difference between DGTW-adjusted monthly returns in the high and low DLI quintiles, $ret^{high\ DLI} - ret^{low\ DLI}$. Column "High ADV" displays the differences for portfolios of firms in the top tercile of the shareholder advantage measure, while column "Low ADV" reports the differences for portfolios in the bottom tercile of the measure. In Panel B2, I report the difference between DGTW-adjusted returns in the highest and lowest ADV tercile, $ret^{high\ ADV} - ret^{low\ ADV}$. Column "High DLI" displays the differences for portfolios of firms in the top DLI quintile, while column "Low DLI" reports the differences for portfolios in the bottom DLI quintile. Column "High-Low" reports the difference of the difference and its *t*-statistic in the top and bottom ADV terciles (Panel B1) or in the top and bottom DLI quintiles (Panel B2). All *t*-values are adjusted by Newey-West (1987) with lag 3. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Summary Statistics of Shareholder Advantage

	Book Lev	Mkt Lev	Equity	AVL	R&D	Hfdl	Tang
Full Sample	14	17.86	100	227	0.12	5.50	54.97
With Bonds	28.67	29.57	834	1146	0.01	4.55	50.11
Without Bonds	10.04	14.55	62	128	0.28	5.57	56.22

Panel B: Shareholder Advantage Effects on Stock Returns

	Panel B1: ret $^{high DLI}$ - ret $^{low DLI}$		**Panel B2: ret $^{high ADV}$ - ret $^{low ADV}$**		
	High ADV	Low ADV	Low DLI	High DLI	High - Low
Bargaining Power					
-Asset Size	-0.29	0.36	-0.09	-0.75***	-0.66***
With Bonds	-0.04	-0.36	0.07	0.39*	0.32
Without Bonds	-0.32*	0.46*	-0.11	-0.89***	-0.78***
-R&D Expenditures	-0.42*	-0.07	-0.14	-0.49*	-0.35
With Bonds	-0.21	-0.11	-0	-0.11	-0.11
Without Bonds	-0.13	-0.26	-0.3	-0.17	0.13
Liquidation Costs					
-Industry Concentration	-0.54***	-0.26	0.1	-0.19	-0.29
With Bonds	-0.11	-0.29	0.02	0.21	0.19
Without Bonds	-0.53***	0.15	0.05	-0.64***	-0.69***
-Asset Tangibility	-0.47**	-0.39	-0.01	-0.09	-0.08
With Bonds	-0.2	-0.12	0.13	0.05	-0.08
Without Bonds	-0.53***	0.09	-0.03	-0.65***	-0.62**

Table 4: Default Likelihood Indicator (DLI), Yield Spread, and Bond Returns

At the beginning of each month *t* from January 1994 to October 2006, I first sort firms with bonds outstanding into three DLI terciles and then, within each DLI tercile, sort firms into three terciles of the chosen proxy for shareholder advantage (ADV)–Asset size, R&D expenditures, Industry concentration, and Asset tangibility. For firms with bond trades in the sample period, I record the value-weighted yield spreads in month *t* and DGTW-adjusted stock returns and index-adjusted bond returns in month *t+2* on each of these portfolios. I then compute the time series mean and corresponding *t*-statistics. For a given month to be included in the computation of the time series mean, each sub-portfolio in that month must have at least five firms. See previous tables for the computation of yield spreads and adjusted bond returns. In Panel A, I report the difference between DGTW-adjusted monthly stock returns, yield spreads and adjusted bond returns in the high and low DLI terciles, $ret^{high\ DLI} - ret^{low\ DLI}$. Column "High ADV" displays the differences for portfolios of firms in the top tercile of the shareholder advantage measure, while column "Low ADV" reports the differences for portfolios in the bottom tercile of the measure. In Panel B, I report the difference between DGTW-adjusted monthly stock returns, yield spreads, adjusted bond returns in the highest and lowest ADV tercile, $ret^{high\ ADV} - ret^{low\ ADV}$. Column "High DLI" displays the differences for portfolios of firms in the top DLI tercile, while column "Low DLI" reports the differences for portfolios in the bottom DLI tercile. Column "High-Low" reports the difference of the difference and its *t*-statistic in the top and bottom ADV terciles (Panel A) or in the top and bottom DLI terciles (Panel B). All *t*-values are adjusted by Newey-West (1987) with lag 3. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Panel A: ret $^{high\ DLI}$ - ret $^{low\ DLI}$		**Panel B: ret $^{high\ ADV}$ - ret $^{low\ ADV}$**		
	High ADV	Low ADV	Low DLI	High DLI	High-Low
Bargaining Power					
-Asset Size					
DGTW-Adjusted Stock Ret	0.42	0.56	-0.46*	-0.60	-0.14
Yield Spread	153***	447***	-61***	-355***	-294***
Index-Adjusted Bond Ret	0.14	0.23	-0.34*	-0.42	-0.08
-R&D Expenditures					
DGTW-Adjusted Stock Ret	-0.12	0.72	0.34	-0.50	-0.84
Yield Spread	179***	149***	22***	51	29
Index-Adjusted Bond Ret	0.26	0.13	-0.02	0.11	0.13
Liquidation Costs					
-Industry Concentration					
DGTW-Adjusted Stock Ret	-0.07	0.97**	0.14	-0.90	-1.04
Yield Spread	160***	154***	6	13	7
Index-Adjusted Bond Ret	-0.04	0.48***	0.22***	-0.30	-0.52***
-Asset Tangibility					
DGTW-Adjusted Stock Ret	0.62	0.50	-0.22	-0.09	0.13
Yield Spread	137***	171***	-0	-35	-35**
Index-Adjusted Bond Ret	0.39*	0.27	-0.18*	-0.06	0.12

Table 5: DLI Measures and Returns: Regressions Analysis

This table presents the results from the Fama-MacBeth regression analysis using stock (Panel A) and bond (Panel B) returns as dependent variables (in percentage) measured in month *t+2*. For each model, I first run a cross-sectional regression every month, and then calculate the time series averages and Newey-West adjusted *t*-statistics with lag 3 (in parenthesis) of regression coefficients. The independent variables are as follows: *Beta*, obtained in month *t* by regressing preceding 60-month monthly returns with a minimum of 24 observations on the CRSP value-weighted index; *Ln (AVL)*, the natural log of a firm's implied market value of assets at the end of month *t*; *Ln (B/M)*, the natural log of a firm's book-to-market ratio; *Ret (-6, -1)*, the six-month average returns from month *t-5* to month *t*; *DLI*, a normalized DLI rank variable between 0 and 1 in month *t*; rank-transformed R&D expense (*R&D*), Herfindahl index (*Hfdl*), asset tangibility (*Tang*), and interaction terms of *Ln (AVL)*, *R&D*, *Hfdl*, and *Tang* with *DLI* measures, respectively. *R&D*, *Hfdl*, and *Tang* are all measured at the fiscal year that ends in year *t* and are attributed to the one-year period starting from July of year *t+1* ranging from 1 to 10. *Bond* dummy equals one if the firm has bonds outstanding in month *t* and 0 otherwise. S&P and Moody's ratings are numerically converted such that the AAA bonds take a value of 22, AA of 21, and so on. Bond returns below the 1st or above the 99th percentiles are set as missing. The sample period spans from 1975 to 2006 in Panel A and from 1994 to 2006 in Panels B and C, respectively. Intercepts are not reported. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Shareholder Advantage and Distress Risk Premia in Stock Returns

Models	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Beta	0.0305	0.0725	0.0797	-0.0131	0.0651	0.0212	-0.0006
	(0.24)	(0.59)	(0.67)	(-0.13)	(0.54)	(0.19)	(-0.01)
Ln (AVL)	-0.0503*	-0.1016***	0.0912***	-0.0681***	-0.0831***	-0.0644***	0.096***
	(-1.78)	(-4.44)	(2.86)	(-3.77)	(-4.29)	(-3.28)	(3.34)
Ln(B/M)	0.4196***	0.4584***	0.439***	0.5131***	0.4691***	0.4628***	0.4881***
	(6.12)	(6.86)	(6.42)	(8.68)	(7.26)	(6.92)	(8.12)
Ret(-6,-1)	0.0109	0.0085	0.0101	0.0072	0.0082	0.0079	0.0077
	(0.89)	(0.75)	(0.92)	(0.66)	(0.74)	(0.73)	(0.73)
DLI		-0.7975***	1.3175**	-1.3739***	-0.0236	-0.7799*	0.5745
		(-3.45)	(2.00)	(-4.39)	(-0.08)	(-1.91)	(0.77)
R&D				0.0146			0.0054
				(0.40)			(0.19)
Hfdl					0.0485**		0.034*
					(2.35)		(1.75)
Tang						0.0264	-0.0081
						(0.73)	(-0.33)
Ln (AVL) x DLI			-0.4721***				-0.4535***
			(-3.89)				(-4.15)
R&D x DLI				0.1763***			0.1521***
				(5.65)			(4.41)
Hfdl x DLI					-0.1017***		-0.0578**
					(-3.7)		(-2.09)
Tang x DLI						0.0823**	0.0774**
						(2.18)	(2.26)
Bond x Ln (AVL)			-0.0677***				-0.1295***
			(-2.43)				(-3.03)
Bond x R&D				-0.031			-0.0131
				(-1.01)			(-0.28)
Bond x Hfdl					-0.0078		0.0876***
					(-0.26)		(3.14)
Bond x Tang						-0.0207	0.0114
						(-0.77)	(0.35)
Bond x Ln (AVL) x DLI			0.1283***				0.356***
			(2.77)				(4.38)
Bond x R&D x DLI				-0.0436			-0.0314
				(-1.06)			(-0.39)
Bond x Hfdl x DLI					-0.061		-0.1651***
					(-1.51)		(-3.21)
Bond x Tang x DLI						-0.0748*	-0.0979*
						(-1.78)	(-1.76)
Avg. Adj. R-Sq	0.03	0.03	0.04	0.04	0.03	0.03	0.04

Panel B: Shareholder Advantage and Distress Risk Premia in Bond Returns

Models	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Ln(AVL)	-0.0596***	-0.0466**	0.0531	-0.0518***	-0.0489**	-0.0469**	0.0299
	(-2.86)	(-2.24)	(1.41)	(-2.40)	(-2.33)	(-2.20)	(0.72)
Ln(BM)	-0.0152	-0.0053	0.0052	0.0046	-0.0055	-0.0056	0.0059
	(-0.41)	(-0.15)	(0.14)	(0.13)	(-0.16)	(-0.17)	(0.18)
DLI	0.3799**	0.3678**	1.8956***	0.394	0.5285**	0.5671**	1.8171***
	(1.96)	(2.09)	(2.93)	(1.39)	(2.00)	(2.20)	(2.67)
R&D				0.0145			-0.0087
				(0.58)			(-0.32)
Hfdl					0.0233		0.0254
					(1.40)		(1.32)
Tang						0.0294	0.0258
						(0.93)	(0.76)
Ln(AVL) x DLI			-0.1862***				-0.1505**
			(-2.67)				(-2.00)
R&D x DLI				-0.0096			0.0354
				(-0.19)			(0.63)
Hfdl x DLI					-0.0363		-0.043
					(-1.20)		(-1.16)
Tang x DLI						-0.0483	-0.0503
						(-0.88)	(-0.83)
Rating (x 10^{-3})		-9.80	-7.93	-10.32	-8.24	-7.86	-6.47
		(-1.23)	(-1.00)	(-1.31)	(-1.01)	(-1.01)	(-0.81)
Maturity (x 10^{-3})		11.65***	12.44***	12.01***	11.54***	10.62**	10.77**
		(2.48)	(2.63)	(2.5)	(2.42)	(2.29)	(2.24)
Adj. R-Sq	0.02	0.04	0.05	0.05	0.04	0.05	0.05

Table 6: Bond Yield Spread Regression

I calculate the yield to maturity on each bond and its spread over the closest benchmark U.S. treasury in all trading days in month *t*. An issue's yield spreads in month *t* are then averaged to obtain monthly yield spreads, which are the dependent variables in all regression models. S&P and Moody's ratings are numerically converted such that the AAA bonds take a value of 22, AA of 21, and so on until the NR bonds take a value of 0. *Equity sigma* is the standard deviation of excess daily equity returns relative to the CRSP value-weighted index over the 180 days preceding (not including) the bond trade month. *Maturity* is the remaining years to maturity. Bonds with maturities of less than one year are eliminated. *Coupon* is the coupon rate on the bond issue. *Amount* is the offering dollar amount of the bond issue. *Interest Coverage* is (Item178+Item15)/Item15. *r* is the closest benchmark Treasury rate. *Market firm* is the sum of the market value of equity and debt. The market value of equity is obtained from CRSP. The market value of a firm's total debt is estimated by multiplying the book value of the total interest-bearing debt (Item9+Item34+Item206) by the average bond price in the end of last month using the offering amounts as weights. *Debt/Asset*, or *book leverage*, is (Item9 / Item6). *Debt/Cap*, or *market leverage*, is (Item9+Item34+Item104) / (Item181+Item199*Item25). *Income/Sale* is Item13/Item12. Panel A reports summary statistics for the sample used in the regressions, and Panel B reports the regression results with issuer fixed effects. Using panel data between 1994 and 2006, I regress yield spread against the variables listed in panel A (except for market equity and market firm values); *DLI*, a normalized DLI rank variable between 0 and 1 in month *t*; *Ln (AVL)*, the natural log of a firm's implied market value of assets at the end of month *t*, and interaction terms of *Ln (AVL)*, R&D expense (*R&D*), Herfindahl index (*Hfdl*), asset tangibility (*Tang*) with *DLI* measures. *R&D*, *Hfdl*, and *Tang* are all rank-transformed ranging from 1 to 10 and are measured at the fiscal year that ends in year *t-1* and attributed to the one-year period starting from July of year *t*+1. All regressors (except for rank-transformed variables) below the 1st or above the 99th percentiles are set as missing. Firms with zero leverage ratios are discarded. Spread is set as missing if below the 5th or above the 95th percentiles, and observations with negative or zero yield spreads are excluded. All regressions include fixed effects for each bond issuer, month dummies, an intercept, and 1-digit sic code dummies. Coefficients on the intercept, month dummies, and sic dummies are not reported for conciseness. I also report the number of issue-month observations for each model. The values for *t*-statistics appear in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Summary Statistics

Variable	Mean	Std.	Min	Quarter1	Median	Quarter3	Max
Spread (bps)	189.1	140.07	0.01	84.94	148.43	248.45	667.07
Rating	13.5	4.53	0	11.81	14	17	22
Sigma (%)	32.3	15.85	12.63	20.7	28.79	39.78	152.43
Maturity	9.58	7.56	1	4.41	7.21	10.18	30.46
Amount	363,201	301,413	50,000	200,000	260,000	450,000	2,500,000
r (%)	4.8	1.23	1.07	4.08	4.83	5.71	8.2
Coupon (%)	7	1.65	0	6.25	7	8	11.25
Market Equity (M)	19,425	34,594	5	2,570	7,931	19,447	386,904
Market Firm (M)	27,529	47,908	12	4,325	12,746	28,272	863,303
Interest Coverage	6.65	7.16	-30.12	3.05	4.75	7.72	73.05
Debt/Asset	29.53	13.32	0.01	19.82	28.72	37.64	75.65
Debt/Cap	24.69	13.88	0.01	13.68	23.35	33.44	73.94
Income/Sale	0.19	0.16	-3.4	0.11	0.17	0.25	0.68

Panel B: Regressions with Issuer Fixed Effects

Models	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Equity Sigma (%)	45.38***	56.68***	28.93***	33.56***	33.82***	33.84***	29.77***
	(20.73)	(31.53)	(11.94)	(14.58)	(14.98)	(14.17)	(11.92)
Rating	-4.8***	-3.87***	-3.1***	-4.36***	-4.47***	-4.41***	-2.95***
	(-9.37)	(-8.34)	(-7.12)	(-8.54)	(-8.85)	(-8.63)	(-6.85)
BBB or worse	29.17***	27.94***	22.98***	26.21***	24.47***	25.55***	23.46***
	(5.37)	(4.94)	(4.45)	(4.6)	(4.51)	(4.58)	(4.58)
Coverage <5	-34.11***	-22.48***	-35.3***	-39.2***	-38.64***	-37.89***	-36.34***
	(-4.81)	(-3.27)	(-5.02)	(-5.78)	(-5.8)	(-5.81)	(-5.34)
5 <= Coverage <10	-29.38***	-18.2***	-30.73***	-33.62***	-33.01***	-31.86***	-32.29***
	(-4.96)	(-3.34)	(-5.26)	(-5.94)	(-5.9)	(-5.68)	(-5.63)
10 <= Coverage <20	-18.17***	-8.84	-16.45***	-16.53***	-18.02***	-17***	-15.85***
	(-3.08)	(-1.62)	(-2.69)	(-2.9)	(-3.31)	(-3.04)	(-2.69)
Income/Sale	-0.17	0.03	-0.04	-0.15	-0.14	-0.14	-0.05
	(-1.59)	(0.31)	(-0.37)	(-1.43)	(-1.29)	(-1.25)	(-0.4)
Debt/Asset	0.15	0	0.21	0.37	0.42*	0.38*	0.22
	(0.64)	(0.01)	(0.93)	(1.53)	(1.85)	(1.72)	(0.96)
Debt/Cap	1.9***	1.65***	1.06***	1.17***	1.04***	1.07***	1.18***
	(6.17)	(5.66)	(3.1)	(3.71)	(3.64)	(3.76)	(3.52)
r (%)	-16.98***	-13.63***	-16.45***	-16.87***	-16.7***	-16.65***	-16.65***
	(-8.14)	(-10.07)	(-8.02)	(-7.81)	(-8)	(-7.97)	(-7.91)
Ln (Maturity)	4.89***	3.62**	6.16***	5.04***	4.91***	5.11***	6.16***
	(2.74)	(2.27)	(3.57)	(2.82)	(2.87)	(3.01)	(3.64)
Coupon (%)	21.24***	22.5***	20.48***	21.18***	21.03***	21.14***	20.48***
	(21.09)	(22)	(21.28)	(21.29)	(21.42)	(21.48)	(21.01)
Ln (Amount)	-11.97***	-11.53***	-1.89	-14.46***	-13.89***	-14.07***	-2.36
	(-5.52)	(-5.72)	(-0.73)	(-7.18)	(-6.75)	(-6.52)	(-0.96)
DLI		51.15***	311.69***	106.52***	105.44***	115.16***	282.5***
		(5.1)	(6.62)	(6.69)	(9)	(9.49)	(5.09)
Ln (AVL) x DLI			-22.89***				-23.94***
			(-3.99)				(-4.38)
R&D x DLI				1.88			5.99***
				(0.77)			(2.59)
Hfdl x DLI					1.78		2.61*
					(1.28)		(1.77)
Tang x DLI						-0.01	-1.2
						(-0.01)	(-0.5)
R-square	0.58	0.58	0.60	0.59	0.59	0.59	0.60
Issue-Month Obs.	88,932	88,570	88,570	86,045	88,570	87,354	84,830

Table 7: Shareholder Advantage Effect: Financial Leverage and Renegotiation Frictions

At the beginning of each month *t* from January 1975 to October 2006, firms without bonds outstanding are sorted into two groups of equal size by book leverage ratio and short-term debt ratio, respectively. Within each group, I sort firms into five DLI quintiles and then, within each DLI quintile, I sort firms into three terciles of the chosen proxy for shareholder advantage (ADV)–Asset size, R&D expenditures, Industry concentration, and Asset tangibility. In month *t+2*, I record the value-weighted DGTW-adjusted stock returns on each of these portfolios and compute the time series mean and corresponding *t*-statistics over the entire sample period. Book leverage is Item9/Item6, and the short term debt ratio is Item34 / (Item9+Item34). In panel A, I report the difference between returns in the high and low DLI quintiles, $ret^{high\ DLI}$ - $ret^{low\ DLI}$. Column "High ADV" displays the differences for portfolios of firms in the top tercile of the shareholder advantage measure, while column "Low ADV" reports the differences for portfolios in the bottom tercile of the measure. In Panel B, I report the difference between returns in the highest and lowest ADV tercile, $ret^{high\ ADV}$ - $ret^{low\ ADV}$. Column "High DLI" displays the differences for portfolios of firms in the top DLI quintile, while column "Low DLI" reports the differences for portfolios in the bottom DLI quintile. Column "High-Low" reports the difference of the difference and its *t*-statistic in the top and bottom ADV terciles (Panel A) or in the top and bottom DLI quintiles (Panel B). All *t*-statistics are adjusted by Newey-West (1987) with lag 3. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Panel A: $ret^{high\ DLI}$ - $ret^{low\ DLI}$		Panel B: $ret^{high\ ADV}$ - $ret^{low\ ADV}$		
	High ADV	Low ADV	Low DLI	High DLI	High-Low
Bargaining Power					
-Asset Size					
Low Book Lev	-0.60**	0.45	-0.06	-1.12***	-1.06***
High Book Lev	-0.12	0.72*	-0.23	-1.07***	-0.84
Low Short-Term Debt	-0.56***	1.01***	-0.01	-1.58***	-1.57***
High Short-Term Debt	-0.66***	1.53***	0.13	-2.06***	-2.19***
-R&D Expenditures					
Low Book Lev	-0.19	-0.39	-0.3	-0.11	0.19
High Book Lev	-0.31	0.06	0.19	-0.18	-0.37
Low Short-Term Debt	0.06	0.65*	-0.11	-0.70***	-0.59***
High Short-Term Debt	0.34	1.00***	-0.18	-0.85***	-0.67**
Liquidation Costs					
-Industry Concentration					
Low Book Lev	-0.72**	-0.11	0.06	-0.55	-0.61
High Book Lev	-0.78***	0.17	0.14	-0.81***	-0.95***
Low Short-Term Debt	-0.14	0.35	0.02	-0.48*	-0.50**
High Short-Term Debt	0.36	0.7**	0.04	-0.29	-0.33
-Asset Tangibility					
Low Book Lev	-1.05***	0.01	-0.01	-1.07***	-1.06***
High Book Lev	-0.52	0.84	0.64	-0.73**	-1.37
Low Short-Term Debt	-0.51***	0.58***	0.02	-1.07***	-1.09***
High Short-Term Debt	0.27	0.75***	-0.18	-0.66***	-0.48*

Table 8: Stock Returns across DLI and Trading Costs

At the beginning of each month *t* from January 1970 to October 2006 I sort firms with stock price greater than $5.00 into three terciles of chosen proxies for trading costs, liquidity measures, and idiosyncratic volatility, respectively, and then within each tercile, I sort firms into five quintiles of distress risk. In month *t+2*, I record the value-weighted DGTW-adjusted stock returns on each of these portfolios and compute the time series mean and correspondent *t*-statistics. The sample period of DGTW-adjusted returns spans from 1975-2006 due to the availability of the DGTW benchmark portfolio returns. I report distress risk premia, *i.e.*, the difference between monthly returns in the high and low distress quintiles, $ret^{high\ Distress} - ret^{low\ Distress}$. Columns "High," "Medium," and "Low" display the differences for portfolios of firms in the top, medium, and bottom tercile, respectively. Column "High-Low" reports the difference of the difference and its *t*-statistic in the top and bottom terciles. *Bid-ask spread* (1993-2006) is monthly average daily bid-ask spread (scaled by the midpoint of the bid and ask quotes) computed from TAQ in month *t+1*. *Effective bid-ask spread* is the moment estimate of effective cost (Roll (1984)), scaled by price, infeasible set as zero. *Log effective bid-ask spread* is the moment estimate of log effective cost (Roll (1984)), infeasible set as zero. *Gamma* is the estimation of liquidity in the Pastor and Stambaugh (2003) regression. *Amivest liquidity measure* is the average daily ratio of absolute returns to volume. *Amihud illiquidity ratio* is the average daily ratio of volume to absolute return. These measures (1970-2003) are obtained from Hasbrouck (2005). *Proportion of prices reported as midpoint of quote* is the number of daily prices reported as quote midpoints (*i.e.*, <0 on CRSP) relative to the number of non-missing prices in the year. *Proportion of zero returns (volumes)* is the proportion of days with zero returns (volumes) relative to the number of days with non-missing returns (volumes). These four measures (1970-2006) are estimated from CRSP in year *t-1* and applied to year *t*. *Stock price* is the price in the end of month *t*. *Idiosyncratic volatility* is obtained by regressing daily returns on the CRSP value-weighted index during the six-month period before the holding month, and then computing the variance of the residuals. For *gamma*, *Amivest liquidity ratio*, and *price*, firms are ranked in descending order; for all other measures, firms are ranked in ascending order. The *t*-statistics are adjusted by Newey-West (1987) with lag 3. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	$ret^{High\ DLI} - ret^{Low\ DLI}$			
	High	Medium	Low	High-Low
Bid-ask spread	-0.47	-0.12	-0.19	-0.28
Effective bid-ask spread	-0.22*	0.10	-0.18	-0.05
Log effective bid-ask spread	-0.32**	-0.23	-0.18	-0.14
Pastor and Stambaugh Gamma	-0.29*	-0.10	-0.42***	0.13
Amihud Illiquidity Ratio	-0.49***	-0.31**	-0.18	-0.30*
Amivest Liquidity Ratio	-0.39***	-0.36**	-0.18	-0.21
Prop. of prices reported as quote midpoints	-0.32**	-0.34**	-0.16	-0.16
Prop. of zero returns	-0.15	-0.12	-0.23	0.10
Prop. of zero volume	-0.16**	-0.28*	-0.02	-0.13
Stock Price	-0.53***	-0.30*	-0.12	-0.41**
Idiosyncratic volatility	-0.48*	-0.17	-0.05	-0.43*

APPENDIX B

B1: Liquidation Costs

I follow Garlappi *et al.* (2006) to construct two variables as measures of liquidation costs.

$Hfdl_j = \sum_{i=1}^{I_j} s_{i,j}^2$, where $s_{i,j}$ represents the sales of firm *i* (Item 12) as a fraction of the total sales in industry *j*, and I_j is the number of firms belonging to industry *j*. I categorize firms according to the two-digit SIC codes. Asset tangibility is tangible assets ($Item1 + 0.715 * Item2 + 0.547 * Item3 + 0.535 * Item8$) scaled by book assets.

B2: Data Cleaning Procedures

The advantages of using the NAIC and TRACE databases compared to other sources of bond data is that they are much more comprehensive and provide actual transaction prices rather than dealer quotes or matrix prices. I eliminate suspicious transaction data in NAIC (those without legitimate trader names) and remove all AAA-rated bonds from NAIC. I also remove all trades designated as "cancelled," "commission," or "corrected," and all trades with quantity less than 100,000 from TRACE. I then merge the bond data with Compustat and CRSP, taking into consideration merges and acquisitions and changes in the issuer name and CUSIP.

B3: Computation of Yield Spreads and Bond Returns

I follow Campbell and Taksler (2003) to compute the yield to maturity on each bond in the sample and its spread over the closest benchmark U.S. treasury in a particular trading day.[1] I eliminate the top and bottom 1% of spreads from NAIC and TRACE, respectively, to reduce apparent reporting errors. The remaining yield spreads are averaged by month to obtain monthly yield spreads for each issue.

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[1] I obtain the benchmark treasuries from the U.S. Treasury website, which provides daily data for notes and bonds of below-1-year, 1, 2, 3, 5, 7, 10, 20, and 30 target years to maturity.

To compute bond returns, I employ the Handjinicolaou and Kalay (1984) method for daily bond returns. This method addresses the problem that stems from infrequent bond trading. This study follows Bagnani, Milonas, Saunders, and Travlos (1994) to compute monthly bond returns. First, if a bond has multiple trades in a trade day, I follow Cai, Helwege, and Warga. (2005) and average all prices weighted by transactions.[2] Second, I compute daily log bond returns for every two consecutive trades as price returns plus interest accrued and received. Specifically, for a bond, *i*, traded on days *t-n* and *t*, an *n*-day holding period return ($R_{i,tn}$) is calculated as:

$$R_{i,tn} = (F_{i,t} + C_{i,tn}) / F_{i,t-n}$$

Where: $F_{i,t}$ = the flat price (*i.e.*, quoted price plus accrued interest) of bond *i* on day *t*,

$C_{i,tn}$ = coupon payment (if any) during the interval *t-n* to *t*,

n = the number of business days from *t-n* to *t*.

Daily log bond returns (*DR*) for every two consecutive trades are computed as follows:

$$DR_{it} = Ln(R_{i,tn}) / n$$ [3]

Third, for each corporate bond *i* in a particular month *t*, an average daily bond return is obtained by averaging all DR_{it} available in that month using n as the weights. This weighting scheme weights each daily bond return in a given month by the length of the measurement periods over which the return is calculated to avoid giving excessive weight to daily returns obtained from short trading intervals of relatively infrequently traded bonds. The average daily log returns are then converted to average monthly returns.

I apply different filters to yield spreads and bond returns and, in doing so, mitigate the effect of extreme outliers on the analysis while still keep the maximum possible number of good observations for

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[2] I also use the median price, the mean price, and the price of the largest transaction and obtain similar results. While TRACE reports only sell prices, NAIC reports both buy and sell prices. To avoid the potential bid-ask bound effect, I also use the buy price in NAIC only and sell prices in TRACE and obtain similar results.

[3] I also compute daily returns as $R_{i,tn} / n$ and obtain similar results. Daily return observations with *n* greater than 30 are removed to exclude highly illiquid issues.

each variable. Specifically, I discard observations of monthly bond returns below the 1st or above the 99th percentiles. In a separate procedure, I discard observations of monthly yield spreads below the 5th or above the 95th percentiles.[4] As a robustness check, I use the same sample firms to compute bond returns and yield spreads and obtain similar results, which are not reported for brevity.

[4] I also discard observations with negative or zero yield spreads. I explore several alternative cutoffs (0%, 1%, 5%, 10%, and 25%), and the results are not particularly sensitive to the exact filter used. As a robustness check, I also remove all bonds with maturities of less than one year and obtain similar results.

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