The effects of sell-side debt research on debt and equity markets

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Abstract

We study the effects of sell-side debt research on price formation and investor behavior in debt and equity markets. Sell-side corporate debt research involves the production and dissemination of information by sell-side analysts to debt investors. Our sample includes 921 companies with publicly traded bonds and equity over the period from 2002 through 2004, with 429 of them being the subject of 2,758 debt research reports issued by 15 brokers. On debt report publication days, we document abnormally higher absolute returns and trading volume in both the bond and equity markets, as well as higher co-variation in debt and equity returns, controlling for the informational effects of earnings announcements, credit ratings changes and equity analyst reports. Second, we document that in the presence of sell-side debt research, debt returns incorporate public information relatively more quickly. The combined evidence suggests that sell-side debt analysts (i) provide new information to debt and equity markets and (ii) speed up the information flow from the equity to the debt market.

JEL Classification: G15, G21

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1. Introduction

Active information markets are critical to the functioning and efficiency of security markets. Hence, there is a lot of academic research on how information produced by equity analysts, credit rating agencies, and corporations influences security prices and investor behavior. The role of sell-side debt analysts, whose primary objectives are to identify mispriced debt securities and communicate investment ideas to debt investors, however, has been largely overlooked in the prior literature.[1] A notable exception is Johnston et al.'s (2008) investigation of the forces influencing the production of debt research. They offer early evidence consistent with the idea that debt research has consequences for how equity prices impound information about credit ratings.

This study conducts a comprehensive analysis of the informational consequences of debt research on debt and equity markets. Our motivation is twofold. First, brokerage firms expend scarce resources to produce and distribute debt research, which makes it inherently interesting to examine the different ways in which debt research influences price formation and investor behavior in debt and equity markets. What makes an analysis of debt research pricing consequences perhaps even more interesting is that investors can obtain information from other intermediaries such as equity analysts and credit rating agencies, and companies themselves.

Second, many commentators have asserted that credit rating agencies and equity analysts have failed investors by their sluggish response to news, issuing rosy reports or not providing any research coverage on struggling companies, and called for more regulation while overlooking the existence of debt analysts as an alternative information source. This could be an inconsequential omission if debt research does not affect price formation in debt and equity markets, and a faux pas if it does. The significance of these effects is that they would weaken the main premise of the calls for regulation, which is that there is

[1] One reason is that sell-side debt analysts are a recent phenomenon. Their emergence is likely related to the gradual change in the purpose of buying bonds over the last three decades. In particular, an increasing number of investors are purchasing bonds not to hold them to maturity, but to actively trade them and profit from changes in absolute and relative credit quality and changes in interest rates (p. 734, Fabozzi, 2005). A second reason is that sell-side debt reports are not as widely distributed as equity reports and many researchers are simply not aware of the existence of sell-side debt analysts.

no meaningful distinction between information production by credit rating agencies and equity analysts and the total amount of information available to investors.

In general, an information intermediary can add value by (i) generating new information and (ii) speeding up the process by which available information is impounded in prices. Accordingly, we conduct two sets of analyses. First, we examine whether the publication of sell-side debt research leads to higher variance and covariance in debt and equity returns, and higher trading volume in debt and equity markets, controlling for earnings announcements, credit ratings changes, and equity analyst recommendations. Evidence that markets react to the publication of a debt report would be consistent with the idea that debt analysts provide new information. Second, we examine whether the existence of debt analyst coverage reduces the lag with which debt returns incorporate public information (Kwan, 1996). Evidence that debt returns lag equity returns less would support the hypothesis that debt analysts help ensure that public information is impounded in debt prices.

Our sample includes 921 companies with publicly traded debt and equity over the period from 2002 through 2004. 429 of the sample firms have debt analyst research coverage. A summary of our empirical results follows.

The publication of a debt report has informational effects in both debt and equity markets and these effects are economically important. The effect of debt reports on absolute debt returns is higher than the effect of any other information event; the effect of debt reports on debt market trading volume is comparable to the effects induced by the most important information events: credit rating changes and earnings announcements. In addition, debt reports have a distinct effect on both absolute equity returns and turnover.

Second, we document that the publication of a debt report leads to higher covariation in bond and equity returns. In particular, the co-variance between bond and equity returns increases by 10 percent of its standard deviation when debt reports are published. This result suggests that, on average, sell-side debt research provides information useful for the valuation of the company assets, which ultimately determine the value of debt and equity claims. Partitioning the sample by credit rating, we find that debt reports induce higher (lower) covariation in debt and equity returns primarily for companies with good (poor) credit ratings. This result suggests that the nature of the information conveyed by reports on companies in distress is different from that of reports on companies in good financial health. Reports on distressed companies mainly convey information about changes in risk or the division of assets between debt and equity holders in the event of a liquidation rather than information about company cash flows or assets.

Finally, using the empirical framework of Kwan (1996), we document that in the presence of sell-side debt research, debt prices lag equity prices less. In particular, we find a significant decline in the cross-serial daily correlation between debt and equity returns. This effect is robust to controlling for credit rating and especially pronounced in the opposite ends of the credit spectrum, AAA through A-, and unrated. Further, we find that the influence of debt analysts on debt price lag exists primarily for companies which have relatively smaller amounts of public debt outstanding.

Our study makes several contributions. First, we further establish the unique and important informational role of debt analysts. Our evidence that return volatility, trading volume, and the covariation in debt and equity returns *jointly* increase when sell-side debt reports are disseminated both confirms and complements the evidence in Johnston et al. (2008) that equity prices respond to debt research and the evidence in De Franco et al. (2008) that debt prices and volume respond to debt research.[2] In addition, our evidence of increased co-variation in debt and equity returns and equity turnover around debt report publication days makes our understanding of the informational consequences of sell-side debt research more complete and provides novel insights about the nature of the information conveyed by debt reports. Finally, we demonstrate that debt analysts add value not only by producing new information, but also by speeding up the process by which prices impound public information.

Our second contribution is toward the literature on the informational efficiency of debt markets (Kwan, 1996; Hotchkiss and Ronen, 2002; Gebhardt et al., 2005). The evidence that, on average, debt returns tend to lag equity returns, or that debt markets are inefficient with respect to information impounded in equity returns, raises the important question of what market forces exist that would curtail

[2] The DeFranco et al. (2008) study and this study were undertaken independently.

or reduce the debt market efficiency. Our contribution is that we specifically identify sell-side debt analyst activities as such a market force and provide evidence consistent with the idea that debt analysts reduce debt market inefficiency. Our evidence complements the evidence in Ronen and Zhou (2008) who find that institutional bond trades impound information more efficiently than retail bond trades as institutional clients and trading desks are the primary users of debt research and judges of its quality.

Next, we discuss the institutional setting in which sell-side debt research is produced and our hypotheses. Section 3 outlines our data, variables, and empirical methods. Section 4 presents our empirical analyses, and Section 5 concludes.

2. Background and hypotheses

2.1. Sell-side debt analysts

Several institutional features of sell-side corporate debt research lead us to believe that it will have an effect on price formation and trading behavior in debt and equity markets that is distinct from the effects of equity analysts and credit rating agencies. First, similar to equity analysts and credit rating agencies, but independent of them, debt analysts conduct various activities geared toward the production of new information such as gathering and analyzing financial and industry data, visiting companies, participating in conference calls and attending industry conferences. Second, debt investment recommendations and forecasts of credit rating changes are information outputs that distinguish debt research from other types of research. Third, only debt analysts (i) are in continuous interaction with debt investors and (ii) have incentives to quickly disseminate new information to them. For example, Kandler (2001) describes the activities of debt analysts as follows: “Indeed, the best bond analysts operate much like stock analysts. They communicate constantly, providing reams of data electronically; probe deeply into market niches; work closely with nervous clients; and look to add value with timely trading tips.” In addition, the recent SEC’s ban of corporate selective disclosure practices (Regulation Fair Disclosure) covers disclosures to sell-side debt analysts, but not disclosures to credit rating agencies due to the SEC’s belief that sell-side debt analysts, just like equity analysts, would obtain and distribute material information to clients who would then trade profitably at the expense of other traders. Fourth, debt analysts differ from equity analysts in that their primary focus is on predicting changes in debt prices, debt defaults, and changes in credit ratings and communicating this information to debt investors. In sum, institutional evidence supports the idea that the role of debt analysts in security markets is not likely to be subsumed by equity analysts and credit rating agencies and motivates our empirical investigation of the effects of debt research on price formation and trading behavior in debt and equity markets.[3] Next, we motivate and present our hypotheses.

2.2. Debt and equity market reactions to the publication of debt reports

A large academic literature studies debt and equity market reactions to information events. For example, a number of studies document that stock and bond prices react similarly to news about company fundamentals as conveyed by earnings announcements (Datta and Dhillon, 1993; Hotchkiss and Ronen, 2002), credit ratings changes (Hand et al. 1992), and insider stock trades (Datta and Datta, 1996). This is not surprising as both debt and equity values depend on the same fundamentals.

Debt and equity price reactions to events conveying information about wealth transfers between stockholders and debt holders are studied by Alexander et al. (2000). As expected, they find opposite movements in debt and equity prices around such events. In addition, Kwan (1996) and Hotchkiss and Ronen (2002) report that the unconditional correlation between individual corporate bond and equity returns is positive, which is consistent with the idea that news about changes in the value of the firm's assets is the dominant type of company-specific information influencing securities' returns.

We argue that sell-side debt research would affect debt and equity prices similarly. In particular, we predict greater debt and equity return volatility and higher covariation in debt and equity returns on debt report publication days. Theoretically, the value of debt and equity are ultimately determined by the value of company assets, or future cash flows. While there are events that can have opposite effects on

[3] See the Bond Market Association's Guiding Principles To Promote The Integrity of Fixed Income Research (May 2004) for further institutional details.

debt and equity, such as changes in asset risk or wealth transfers from debt holders to equity holders, we think that on average debt reports will provide new information about company assets rather than information about changes in risk or the severity of debt/equity holder conflicts.

The question of how equity markets respond to debt research is partially addressed in Johnston et al. (2008). We extend their work on two dimensions. First, we incorporate additional information events that may potentially explain the existence of an equity market reaction and benchmark the effect of debt reports against the effects of these other important information events such as earnings announcements, credit rating changes, and sell-side equity recommendations. Second, we examine how trading volume in equity markets reacts to the publication of debt research.

The question of how debt markets respond to debt recommendations is the sole focus of DeFranco et al. (2008). Their main result is that returns and trading volume in debt markets respond to debt research. Since Johnston et al. (2008) and DeFranco et al. (2008) analyze different samples and use different research designs, it is difficult to draw conclusions about how debt research affects the contemporaneous relation between debt and equity prices. Hence, the importance of examining the joint reactions of debt and equity markets to the publication of debt research.

2.3. The effect of sell-side debt research on the lead-lag relation between debt and equity prices

The empirical analyses of the lead-lag relation in bond and stock returns favor the hypothesis that on average equity returns lead bond returns. For example, Kwan (1996), Gebhardt et al. (2005), and Downing et al. (2007) find that equity returns lead bond returns, but not vice versa. According to Gebhardt et al. (2005), since equity returns predict future credit ratings changes and future debt returns, the bond market's delayed reaction to news arises in part from the credit rating agencies' delayed reaction to news.

At the same time, there are studies that document circumstances in which debt markets impound information efficiently. For example, analyzing a portfolio of 20 high-yield, actively traded bonds, Hotchkiss and Ronen (2002) find no evidence that equity returns predict future debt returns or vice versa, which suggests that a subset of the corporate debt market impounds information efficiently. In addition, Ronen and Zhou (2008) find that institutional sized bond trades respond to earnings information almost instantaneously, which suggests significant differences in how institutions and individuals process earnings information. Neither paper, nor the lead-lag literature, in general, has identified the link between sell-side debt analyst following and debt market efficiency.

The idea that sell-side debt research has implications for the speed with which debt prices impound publicly available information appears in Johnston et al. (2008), but has remained untested. The general idea that sell-side research has implications for how quickly prices impound information, however, has been examined in the equity market setting. Prior research on equity markets provides empirical evidence that higher equity analyst coverage helps equity prices impound common (Brennan et al., 1993) as well as firm-specific information (Hong et al., 2000) quicker.

Based on the institutional evidence about how sell-side debt analysts function (discussed in section 2.1), we hypothesize that sell-side debt analysts speed up the process by which public information is impounded in debt prices. In particular, they aggregate publicly available information useful for the pricing of debt and distribute it to debt investors. While this information is public, in the sense of already being impounded in equity prices, it may be difficult or costly for debt investors to disentangle information with pricing consequences for debt from information with no pricing consequences for debt.

3. Data and empirical methods

3.1. Sample

Our objective is to explore the impact of debt research in both the debt and equity markets. Therefore, we need to identify companies with a publicly traded bond and traded equity, and then distinguish those companies that have sell-side debt reports.

The source of our bond pricing data is "Trade Reporting and Compliance Engine (TRACE)" disseminated by NASD after June 2002. Overall, there are 2,705 bond issuers in our sample period. To determine whether a bond issuer also has issued equity, we merge our sample of bond issuers with CRSP by 6 digit CUSIP. In the case of non-matches, we also examine whether the bond issuer is a subsidiary of a parent with publicly traded equity, using the FISD database to identify such relations. Overall, there are 1,139 bond issuers that also have issued equity. The number of unique equity issuers, or companies, is lower at 921—it is not uncommon for subsidiaries to issue public debt, but not equity. The total number of bond issues that trade over the period is 5,078 (see Panel A of Table 1 for further detail).

The source of our sell-side debt report data is Investext, which is a provider of full text analyst reports. The sell-side debt report data covers the period from 1999 to 2004 for fifteen brokerage firms, of which six are rated in the top ten of fixed income research firms by Institutional Investor. The intersection of the bond pricing and debt report data is the period from July 1, 2002 to December 31, 2004.

3.2. Market reactions

As we detail in Section 3.3 below, we use an event study approach to evaluate the impact of debt reports. We measure market impact in several ways: absolute debt returns, absolute equity returns, trading volume in debt and equity markets, and covariation between debt and equity returns. Below, we describe the construction of these measures.

3.2.1. Bond market

We use absolute bond returns $BondAbsRet_{it}$ as a measure of a debt report's information content because we cannot sign the content of the report. We compute this variable as follows. First, we calculate individual daily bond returns using bond price data from TRACE and coupon information from FISD. The returns on bonds issued by company i and traded on day t are equal-weighted to construct a bond portfolio return. Then, we take the absolute value of the difference between the portfolio bond return and the daily risk free rate. Finally, we standardize the absolute value of the risk-free adjusted portfolio bond returns by firm i's sample mean and standard deviation of bond returns. As result of this standardization, the distribution of absolute bond returns for every firm in our sample has a mean of zero and a standard deviation of one.

Our volume measure is $BondVol_{it}$. We construct it by first summing up the par values of all bonds issued by company i and traded on day t, and then standardizing this variable using firm i's mean and standard deviation calculated over the sample period.[4],[5]

3.2.2. Equity market

The measures of equity market reaction, $EquityAbsRet_{it}$ and $EquityVol_{it}$ are constructed analogously, except (1) instead of adjusting for the risk free rate we deduct the value weighted market return from equity returns and (2) instead of using dollar volume, we use turnover measured as daily volume divided by the number of shares outstanding.

3.2.3. Covariation in bond and equity returns

Our measure of covariation in bond and equity returns is COV_{it}. For each company i, we calculate the cross-product of (1) daily equity return minus the value-weighted market return and (2) portfolio bond return minus the risk free rate. This variable is standardized by its mean and standard deviation estimated over the sample period. Hence, for any randomly chosen day t and company i, the distribution of COV_{it} has a mean of zero and a standard deviation of one.

3.3. Event study framework

The information event of interest is the publication of a debt report. Our basic hypothesis is that markets react to the publication of a sell-side debt research report, which can be tested by comparing market reactions on event days to market reactions on non-event days. To ensure that markets are not reacting to some other concurrent information event and to assess the economic significance of sell-side debt research reports, we include in our analyses, announcements of earnings and credit ratings changes, as well as the issuance of equity analyst recommendations. We perform two analyses. First, we study the

[4] Standardizing variables with means and standard deviations calculated over 40 or 100 days prior to the event does not change our inferences.
[5] Normalizing the total par value of bonds traded by the total par value of bonds outstanding before the standardization did not change our inferences.

market reactions to the publication of a debt report in event time over a 15 day window. Second, we examine how the market reacts to the publication of a debt report vis-à-vis the occurrences of other information events by estimating the following equation:

$$REACT_{it} = \beta_0 + \beta_1 DR_{it} + \beta_2 ER_{it} + \beta_3 \Delta CR_{it} + \beta_5 EA_{it} + \epsilon_{it} \quad (1)$$

where $REACT_{it}$ is the market reaction for company i on day t ($BondAbsRet_{it}$, $BondVol_{it}$, $EquityAbsRet_{it}$, $EquityVol_{it}$, and COV_{it}), and DR_{it}, ER_{it}, ΔCR_{it}, and EA_{it} are information event indicator variables equal to one on day t, if a debt report, equity recommendation, change in credit rating or earnings announcement takes place, respectively (see Appendix 1 for more information about the definition of these variables). ϵ_{it} is the error term.

Specifying the duration of information events is a challenge. In general, markets react both before and after the day on which information is disseminated, with the pattern in market reaction specific to each information event. Empirically, an arbitrary window length, centered on the announcement day is chosen. Depending on whether this window is "too wide", or "too narrow", parameter estimates can be biased in either direction. To address this concern, we first explore market reactions around the announcement day for each event, and define indicator variables as one on days on which we document abnormal market reactions, and zero otherwise.

3.3.1. Lead-lag relation empirical framework

To test the hypothesis that the incidence of debt research enhances the efficiency of debt markets, we use a framework introduced first by Kwan (1996). The basic equation is:

$$Ret_{it}^{B} = \beta_0 + \beta_1 \Delta Ret_{it}^{RF} + \beta_2 Ret_{i,t+1}^{E} + \beta_3 Ret_{it}^{E} + \beta_4 Ret_{i,t-1}^{E} + \epsilon_{it}, \quad (2)$$

where Ret_{it}^{B} is the raw equally-weighted bond portfolio return for firm i at day t and ΔRet_{it}^{RF} is the change in risk free rate, Ret_{it}^{E} is the contemporaneous equity return, $Ret_{i,t+1}^{E}$ and $Ret_{i,t-1}^{E}$ are lead and lagged equity returns, ϵ_{it} is the error term. If the debt market is efficient with the respect to information impounded in the equity market, then β_4 is zero. If the equity market is efficient with respect to the debt market, then β_2 is zero. Kwan (1996) finds a positive and statistically significant coefficient on lagged equity returns, which suggests that the debt market is inefficient with respect to information impounded in the equity market.[6] Our prediction is that this coefficient would be lower when sell-side debt coverage is present implying that the debt market is less inefficient when sell-side debt analysts are present.

We modify the basic equation by including an interaction term between lagged equity returns and a dummy variable representing the existence of debt coverage, $DF_{it} x\ Ret_{i,t-1}^{E}$. DF_{it} is equal to one, if company *i* has had at least one debt report over a one-year period ending on day *t*, and zero otherwise.[7] A negative coefficient on this interaction term means, that in the presence of debt analyst following, debt returns lag equity returns less.

While Kwan (1996) does not find that debt returns lead equity returns, we also interact leading stock returns with a dummy variable representing the amount of equity coverage, $EF_{it} x\ Ret_{i,t+1}^{E}$.[8] EF_{it} is equal to one, if the number of equity analysts with a recommendation in the prior calendar year of firm *i* at time *t* exceeds the sample median equity coverage in the prior calendar year. If no equity recommendation was released within the past calendar year, we assume zero analysts. The full specification is:

$$Ret_{it}^{B} = \beta_0 + \beta_1\,\Delta Ret_{it}^{RF} + \beta_2\,Ret_{i,t+1}^{E} + \beta_3\,Ret_{it}^{E} + \beta_4\,Ret_{i,t-1}^{E} + \beta_5\,EF_{it} x\ Ret_{i,t+1}^{E} + \beta_6\,DF_{it} x\ Ret_{i,t-1}^{E} + \epsilon_{it} \quad (3)$$

[6] The dependent variable in Kwan (1996) is bond yield. He estimates a negative coefficient, which corresponds to a positive coefficient in a specification with bond return as the dependent variable.

[7] There is no publicly available resource to know the total number of bond analyst reports for any one company. The Investext database includes 15 brokerage firms during our sample period of which 6 are rated in the top 10 of debt research by Institutional Investor.

[8] Similar reasoning predicts that the equity market will be more efficient when equity coverage is more intensive.

4. Empirical Analyses

4.1 Descriptive Statistics

4.1.1. Company characteristics

Panel B of Table 1 contrasts the characteristics of the 429 companies with debt research to the 492 companies without debt research. This classification is based on whether a company is the subject of at least one debt research report over the sample period. As expected, companies with sell-side debt research have a much stronger presence in debt markets: they issue approximately fifty percent more bonds and have median trading volume that is four times as large (5,100,000 vs. 1,201,000). In addition, companies with sell-side debt research appear to be larger in terms of equity capitalization and total assets. However, they have comparable leverage, market to book (only medians are similar), and credit rating.

4.1.2. Cross-sectional distribution of parameters of firms' return and volume distributions

Table 1, Panel C reports cross-sectional mean, median, and standard deviation of company-specific means and standard deviations of our daily market reaction variables - absolute and signed debt returns, total par value of debt traded in billions (*BondVol*), absolute and signed equity returns, equity turnover (*EquityVol*), and covariation in debt and equity returns. All return-based variables and equity turnover are multiplied by 100. The last two rows report the number of companies and the number of observations used in these calculations. While there are 921 companies with publicly traded debt and equity over the sample period, many companies do not have bond transactions on consecutive days, therefore calculating daily returns is problematic. In fact, the number of companies for which we are able to calculate debt returns is only 795. The number of days with valid debt returns is 111,465, considerably lower than the 549,515 days with valid equity returns.

The cross-sectional mean of mean absolute debt returns is 0.98%. The cross-sectional mean of mean absolute equity returns is higher at 1.61%, implying that equity returns are on average more volatile, and should exhibit higher sensitivity to news than debt returns. The cross-sectional mean of the mean total par value of bonds traded is \$6.8 billion. The cross-sectional median is only \$2.7 billion and the cross-sectional standard deviation is \$16 billion. The large difference between the mean and the median and the high standard deviation suggest that the distribution is skewed toward companies with heavy trading volume. The cross-sectional distribution of mean equity turnover is less skewed-the cross-sectional mean and median are 0.79% and 0.57% respectively. The mean equity turnover implies that the average company in our sample has 0.79% of its shares traded on a single day.

Overall, the standard deviations of the parameters characterizing company-specific return and volume distributions are large, which justifies our research design choice to standardize measures of market reaction by subtracting company-specific mean and dividing by company-specific standard deviation.

4.1.3. Information events

Panel A of Table 2 provides the number of information events in our sample where the events are: debt report publications, issuance of equity recommendations, credit ratings changes, and earnings announcements. The first column provides information about the total number of information events. The remaining columns provide information about the number of information events for which we have the market data needed for our analyses of market reactions in debt and equity markets.

Equity recommendations are the most frequent information event in our sample, 26,749, followed by earnings announcements, 8,062, credit ratings changes, 4,920, debt report publications, 2,758. Only 1,117 (1,235) debt reports have data available for calculating debt returns (total par value of debt traded). The number of debt reports for which we can calculate covariance with equity recommendations is 1,114. The number of debt reports with available equity returns and turnover is considerably higher, 2,726.

Panel B reports descriptive statistics on the number of information events per company. The distribution of debt reports per company is highly skewed. The mean and the 75th percentile are equal to three, the median of zero suggests that the majority of the sample companies do not have any debt coverage.

We believe there are two reasons why the number of debt reports in our sample is likely to understate the relative importance of debt analysts as an information intermediary. First, we only have access to the debt analyst reports of 15 brokers whose reports are collected by Investext. Second, it is generally believed that writing and publishing reports is less important for a debt analyst than for an equity analyst. A debt analyst is more likely to disseminate new information internally or externally to important firm clients without publishing a report. As a result, for a debt analyst, published information would understate analyst-generated and disseminated information.

The information-gathering activities of debt analysts, culminating with the publication of a debt report, are likely to be positively correlated not only with those of equity analysts, but also with those of credit rating agencies. In addition, these activities are likely to intensify around earnings announcements when important information about company performance and financial condition is released. To shed light on the relation between the publication of a debt report and other information events, we estimate the following model as a Probit:

$$P(DR)_{it} = \beta_0 + \beta_1\, DR_{\,i(t-1,t-5)} + \beta_1\, DR_{\,i(t-6,t-10)}$$

$$+\beta_3\, ER_{it} + \beta_4\, ER_{i(t-1,t-5)} + \beta_5\, ER_{\,i(t-5,t-10)} + \beta_6\, ER_{i(t+1,t+5)} + \beta_7\, ER_{i(t+5,t+10)}$$

$$+\beta_8\, \Delta CR_{\,it} + \beta_9\, \Delta CR_{\,i(t-1,t-5)} + \beta_{10} \Delta CR_{i(t-5,t-10)} + \beta_{11}\, \Delta CR_{\,i(t+1,t+5)} + \beta_{12}\, \Delta CR_{i(t+5,t+10)}$$

$$+\beta_{13}\, EA_{\,it} + \beta_{14}\, EA_{i(t-1,t-5)} + \beta_{15}\, EA_{i(t-5,t-10)} + \beta_{16}\, EA_{i(t+1,t+5)} + \beta_{17}\, EA_{i(t+5,t+10)} \tag{4}$$

where *DR* (debt report), *ER* (equity recommendation), ΔCR (credit rating change), and *EA* (earnings announcement) are sets of indicator variables. When indexed by *t*, an indicator variable takes the value of one on a debt report publication day, and zero otherwise. When indexed by *(t-1,t-5) or (t+1,t+5)*, an indicator variable takes the value of one, if an information event takes place in a five-day window prior to or after the debt report publication day *t*. This specification allows us to examine whether debt reports are likely to be accompanied, preceded, or followed by other information events.

We report parameter estimates, p-values, and marginal probabilities calculated based on the parameter estimates as follows. First, we calculate the probability of a debt report when all indicator variables are zero. In our sample period this (unconditional) probability is 0.30%. We then calculate the probability of a debt report conditional on one indicator variable equal to one. The difference between these two probabilities is the marginal probability reported in the last column of Table 2, Panel C. We focus on these marginal probabilities in lieu of the parameter estimates to give a better idea of the significance of the documented relations.

The main findings are as follows. We find that the contemporaneous relation between the incidence of a debt report and other information events is very strong. For example, the probability that a debt report will occur concurrent with an earnings announcement is higher by 2.17%. The relation between debt reports and equity reports is comparable to the relation between debt reports and credit rating changes. The marginal probabilities are 0.49% and 0.57% respectively. The existence of a strong contemporaneous relation between the incidence of debt reports and other information events suggests that to draw inferences about how sell-side debt analysts impact security markets it is important to control for information disseminated by concurrent events.

The results also show that debt reports are more likely to be observed in close proximity to earnings announcements and credit rating changes than otherwise. For example, the probability of observing a debt report in a five-day window before the announcement of earnings (credit rating change) increases by 0.17% (0.18%). These magnitudes are not trivial as the unconditional probability is only 0.30%. For equity reports, the corresponding marginal probability is 0.20%.

The probability of a debt report following an earnings announcement or credit rating change within five days is 1.28% and 0.21% respectively. We conclude that credit rating changes and earnings announcements lead to increased activities by sell-side debt analysts. The strong link between debt reports and credit rating changes further supports the idea that increased information activities by sell-side debt analysts are predictive of credit rating changes (Johnston et al., 2008).[9]

4.2. Event study analyses

4.2.1. Market reactions to the publication of a debt report in event time

In this section we examine the pattern of market reactions to the publication of debt reports over a 15 day window, from day -5 to day +9, where 0 is the day on which the debt report is published. The five columns of Panel A of Table 3 contain mean values of the analyzed market reactions in event time, with *** (**) (*) indicating their significance at 1% (5%) and (10%) level. The standard errors are adjusted for the existence of cross-sectional correlation in observations that occur on the same day in calendar time. In the bottom row, we also report the number of observations used in these analyses. These numbers are lower than the number of events with available market data reported in Panel A of Table 2, due to our research choice, in aggregating observations across companies, to exclude debt reports issued within 15 days of a debt report on the same company. In other words, we aggregate observations on the same company only if its debt reports are more than 15 days apart (see Panel C of Table 2 for evidence of clustering in debt reports).[10]

Since our standardization uses company-specific sample means and standard deviations, a positive (negative) mean indicates that absolute returns, trading volume or covariation are higher (lower) than the sample mean. We document significant reaction to the publication of a debt report for all five measures. The coefficient of 0.061 for absolute debt returns implies that the publication of a debt report (day 0) induces an increase in absolute returns that is 6.1% of their time-series standard deviation. Given that the average firm has a standard deviation of about 1.07% (the cross-sectional mean of firms' standard

[9] In contrast with Johnston et al. (2008), we control for the occurrence of equity reports and earnings announcements.

[10] We obtain similar results when we aggregate observations that overlap in event time.

deviations of absolute returns reported in Panel C), this result indicates a price reaction of 6.5 basis points in either direction. The effect of debt reports on equity returns is stronger. Absolute equity returns increase by more than 50% of their standard deviation. Finally, the covariation between debt and equity returns increases by 12% of the standard deviation of the cross-product of debt and equity returns. Similarly, the effects on total par value of debt traded and equity turnover are substantial; they increase by 29% and 76% of their respective standard deviations.

The results also show market responses both before and after the debt reports. Equity return volatility, equity turnover, and total par value of debt traded respond to the publication of a debt report as early as day -3. In the case of our volume measures, we observe unusually high activity well after day 0, as late as day +9 for equity turnover. In the case of our return-based measures, we document negative means in the post-event period that are often fairly large relative to the positive means on day 0 and statistically significant. For example, mean debt and equity absolute returns on day +5 are -0.08 and -0.05 respectively, which implies that the amount of information arriving on day +5 is in fact lower than the sample average.

Concluding that security markets respond to the publication of debt reports would be premature, however, in view of the evidence that (i) debt reports are contemporaneously and serially correlated with other information events and (ii) market reactions are often not limited to day zero. We depart from the tradition in the literature which excludes observations that occur in a window around competing information events, and where the size of the window is chosen arbitrarily, and instead select window size based on an analysis of market reactions to competing information events in event time. In particular, for each market reaction and information event, we test whether the mean reaction is positive and statistically different from zero for each day in a 15-day window, where day 0 is the day on which the information event takes place. For each information event- market reaction, in Panel B of Table 3 we report the window over which we reject the null of no market reaction at a 5% significance level.

We have several findings regarding the appropriate size of the window. Equity turnover around information events is unusually high over long periods; [-1,6] for earnings announcements, [-4,6] for credit rating changes, and [-3,9] and [-4,9] for equity recommendations and debt reports respectively. Hence, when we analyze equity turnover around the publication of debt reports, we exclude debt reports that occur within the period [-1,6] of earnings announcements, [-4,6] of credit rating changes, and [-3,9] of equity recommendations. The windows over which we observe unusually high equity return volatility are shorter, and with the exception of an earnings announcement event, include more pre-event than post-event days. For example, absolute equity returns for debt reports or equity recommendations are unusually high over the period [-3,1].

Table 3, Panel C replicates our analyses in Panel A after excluding observations likely to be contaminated by the information impact of competing information events as detailed above. The exclusions significantly reduce the number of observations, especially for our analyses of equity turnover and total par value of debt traded (from 1,742 to 319 and 745 to 263). While mean market reactions and statistical significance decline, we still find evidence that markets respond to the publication of debt reports. Of the five measures of market reaction to the publication of a debt report, only the increase in covariation on day 0 is no longer statistically significant; however, we still find statistically significant increases in covariation on days +3 and +5.

Before we examine how the market reactions to debt reports compare to the market reactions to other information events, it is important to comment on the evidence that absolute debt returns and trading volume move in opposite directions after the event. In particular, on every day in the period [+1, +5] we find (i) negative absolute returns (statistically significant on days one, four, and five), which means that volatility reverts to or dips below the sample mean, and (ii) positive trading volume (significant on days one and four), which means that volume remains unusually high. Since the ratio of absolute returns to trading volume is a measure of illiquidity (Amihud, 2002), these findings suggest that the publication of a debt report has a short-term negative effect on illiquidity. In view of the importance of liquidity as a feature of financial markets and the abundance of empirical measures of liquidity with no consensus on which one is the best, we leave for future research to comprehensively examine the liquidity consequences of debt research.

4.2.2. Market reactions to debt reports and competing information events

Panel A of Table 4 reports means and standard deviations of the five market reaction measures around debt reports, equity recommendations, credit ratings, and equity recommendations. Panel B reports parameter estimates and p-values, in parenthesis, from our estimations of equation (1) where each event indicator variable is defined as one on day zero, and zero otherwise. Since the independent variables are indicator variables, a parameter estimate reflects the mean market reaction to the occurrence of an information event controlling for the information effects of other contemporaneous information events. This analysis extends our analysis of market reactions in event time in that it allows us to compare day zero market reactions to different information events, and thus, assess their relative importance. Before we comment on the parameter estimates, a caveat is in order. The assessment of relative importance ignores differences in market reactions outside day zero and differences in the relative frequencies of these information events.

We find that debt reports are relatively more important than other information events in that that they induce higher increases in mean debt returns and par value of debt traded than other information events. It is interesting to point out that the effect of credit rating changes on total par value of debt traded is the second largest, but that no effect on debt volatility is discernible. Despite the fact that the news in credit ratings is effectively pre-empted by debt analysts and other information sources, announced credit ratings still trigger significant amount of trades.

In our equity market analyses, we find that earnings announcements induce the greatest increase in absolute returns and turnover. In particular, they increase by 80% and 90% of their standard deviations, respectively. On days debt reports are published, absolute equity returns and equity turnover increase by 38% and 64% of their standard deviations. These effects are comparable to the effects of equity reports. We caution against the conclusion that debt analysts are as important as equity analysts in equity markets. We are comparing market reactions to a one-dimensional, high frequency information signal issued by equity analysts (equity recommendation) to market reactions of a low frequency, multidimensional signal issued by debt analysts (debt report).

The effect of debt reports on the covariation between debt and equity returns is to increase it by about 10% of its time-series standard deviation. This effect is the second highest after the effect of earnings announcements, which induce an increase in covariation of 14% of its standard deviation. Next, we examine whether this evidence is robust to alternative definitions of the event indicator variables.

Recall the evidence reported in Panel B of Table 3 that some information events influence markets well beyond day zero. This evidence suggests a need to better control for the effects of competing information events. What if the informational impact of the debt reports is mostly a reflection of their tendency to cluster around earnings announcements, credit ratings, and equity recommendations that influence markets over as many as 12 days? To address this concern, we redefine each indicator variable to be equal to one over as many days as they influence markets, as reported in Panel B of Table 3 and discussed in sub-section 4.2.1.

The results, reported in Panel C of Table 4, are robust to this alternative definition of the indicator variables. The coefficients on the debt report indicator variables decrease, but retain their statistical significance, and compare favorably to other indicator variable coefficients. For example, the absolute debt return reaction to the publication of a debt report is still the highest of all information events at 0.056, and only slighter smaller than the coefficient reported in the previous panel, 0.067. The coefficient on debt reports in the equity turnover regression experiences the sharpest decline from 0.641 to 0.104. The other coefficients decline by various magnitudes. Thus, the relative importance of debt reports remains intact. We conclude that the effect of debt reports on debt and equity markets is not sensitive to a more comprehensive definition of information event indicator variable.

4.2.3. Credit ratings and covariation on debt report publication days

We argued in section 2.2 that, on average, debt reports are likely to convey information about firm cash flows or the value of the total assets, and that debt and equity returns around debt report publication days are likely to exhibit higher covariation. This prediction is supported by the evidence provided in Tables 3 and 4. It is possible however, that there are circumstances in which debt reports would convey information about how total cash flows will be divided between debt and equity holders. For example, as the conflict between bondholders and equity holders becomes more severe, and the potential for wealth transfers between two groups of claim holders increases, analysts may devote more resources to analyzing future events resulting in wealth transfers rather than events resulting in greater or lower total cash flows.

We explore this idea by partitioning our sample by credit rating, and conducting our analyses for each credit rating separately. Credit rating is used as a proxy for the severity of the debt holder - equity holder conflict as in Easton et al. (2007). A second motivation for conducting this analysis for each credit rating separately is the prevalent use of credit ratings by debt market participants: issuers, investment bankers, and investors. Moreover, debt analysts tend to specialize by grade (Investment or High Yield), which makes it interesting to examine whether the information effects of the debt reports depend on the credit rating.

We group ratings in 8 categories (see Appendix 2 for details), and report our results of equation 1 for each rating category with covariation as in the dependent variable in Table 5. We find that the higher covariation in debt and equity returns around debt reports is largely attributable to companies with AAA and AA credit ratings. The coefficients on the debt report indicator variable in the AAA and AA category are 0.382 and 0.172, several times higher than the sample average of 0.062. The coefficients in the next three categories of A, BBB, and BB are about the sample average, 0.061, 0.028, and 0.094, while the coefficients in the last three categories B, CCC+ through D, and unrated are the lowest, 0.022, -0,148, significant at 10%, and 0.049. The near monotonic pattern in the coefficient and the negative coefficient for a sub-sample of companies on the verge of bankruptcy suggests that the effect of debt reports on the covariation in debt and equity returns is dependent on the credit rating. More importantly, the nature of the information conveyed at the low end of the spectrum is fundamentally different from the nature of the information conveyed at the high end of the spectrum.

We also observe some interesting patterns in the coefficients on the credit rating and earnings announcement indicator variables. They tend to be larger for lower credit ratings. For example, in the B category, the coefficient on the credit rating indicator variable is more than five times larger than the sample average (0.142 vs. 0.025); the coefficient on the earnings announcement indicator variable is more than three times the sample average (0.360 vs. 0.112). These results suggest that credit rating changes and earnings announcements induce higher covariation in debt and equity returns for companies with poorer credit ratings.

In sum, we comprehensively examine the effects of debt reports on security markets using five different measures of market reactions. We consistently document that debt and equity markets are affected by the publication of a debt report while controlling for information disseminated by equity analysts, earnings, credit ratings changes. We conclude that sell-side debt analysts influence price formation and investor behavior in both debt and equity markets. Next, we examine whether debt and equity following influence the lead-lag relation between debt and equity returns.

4.3. The effect of debt following on the lead-lag relation in debt and equity returns

Table 6, Panel A presents the univariate statistics for the primary variables to apply the Kwan framework to our sample. The bond return measure is a raw return which differs from the prior analysis in the paper. The mean daily return in our sample is 0.0575% which corresponds to an annual return of slightly greater than two percent. This is significantly lower than Kwan's sample mean return of 9.64%. Our different samples likely explain the mean return difference.

Table 6, Panel B presents the results from the estimations of equation (2), which is the model estimated in Kwan (1996), and equation (3), which allows (i) the coefficient on lagged bond returns to depend on the existence of sell-side debt research, and (ii) the coefficient on lead stock returns to depend on the amount of equity coverage. We report parameter estimates and p-values in parenthesis; standard errors are adjusted to account for daily cross-correlation in bond returns.[11]

Similar to Kwan (1996), we find that debt returns and equity returns are contemporaneously correlated and that the lagged equity returns can predict debt returns. The coefficient on contemporaneous and lagged equity returns are 0.073 and 0.05, statistically significant at 1% level (column 1 of Panel B). In contrast to Kwan (1996) we find that debt returns have some predictive ability of future equity returns. The coefficient on the lead stock returns is 0.008 and statistically significant at 10% level. In sum, we find strong evidence that bond returns lag equity returns, and some evidence that equity returns also lag debt returns. [12]

Our findings about debt market inefficiency extend Kwan's analyses in two ways. First, they alleviate the concern that Kwan's (1996) evidence is driven by his use of quotes rather than transaction prices to measure bond returns. Second, the introduction of TRACE in 2002 has been shown to result in greater liquidity (Edwards et al. (2007); Bessembinder et al. (2006)), which in turn may lead to more information being incorporated in bond prices, and consequently to debt market efficiency. Since our sample period is from 2002 through 2004, we can preclude the hypothesis that debt market inefficiency is limited to the pre-TRACE period.

As expected, we find that in the presence of debt analyst following, debt returns lag equity returns less. In particular, the coefficient on the interaction term between lagged equity returns and debt following is -0.022, statistically significant at 1% level and economically significant as it represents a 34% reduction from the coefficient on lagged equity returns of 0.064 (Panel B, Column 2). However, the existence of debt analyst following reduces, but does not eliminate the debt market inefficiency; the coefficient on lagged equity returns when debt analysts are present is 0.042 (0.064 - 0.022), significantly different from zero at 1% level.

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[11] Our results are robust to (1) clustering by day and firm to address any remaining serial correlation in the error term; (2) including additional lags of equity returns and lagged debt returns; (3) including main effects of debt (DF) and equity following (EF).
[12] Kwan (1995) does find that bond returns predict equity returns for companies rated BB, but explains it with nonsynchronous trading.

Similarly, we find that the coefficient on lead stock returns interacted with equity following is -0.015, statistically significant at 10% level. The coefficient on lead equity returns when equity analysts are present is 0.003 (0.018 - 0.015), economically and statistically indistinguishable from zero.

An alternative empirical approach would be to explicitly model the relation between debt and equity returns using a vector autoregression (VAR) framework (Hotchkiss and Ronen, 2002). We estimated a panel VAR model with five lags of debt and equity returns. The coefficients on the interaction terms between lagged equity returns and debt following and lagged bond returns and equity following are negative, consistent with our general hypothesis that analyst following increases the speed with which security prices impound public information.

We draw two conclusions. First, debt market inefficiency is a general phenomenon that is reduced, but not eliminated by the existence of debt analysts. Second, when equity analyst following is relatively high (low), equity markets are efficient (inefficient) with respect to information impounded in debt returns. In sum, our results are consistent with the hypothesis that sell-side (debt and equity) research speeds up the process by which security prices incorporate publicly available information.

Kwan (1996) documents that debt returns lag equity returns in all credit rating categories. His evidence raises the question of whether debt analyst following affects debt market's lag in all credit ratings categories. Following his approach, we group observations in 8 credit rating categories, see Appendix 2 for further detail, and estimate equation (3) for each category separately. We report the results in Panel A of Table 7.

For all credit ratings categories we document that debt returns lag equity returns in incorporating information. In categories AAA, AA, A, and unrated we find that debt analyst following significantly reduces this lag. Moreover, in AAA, AA, and unrated categories we find that when sell-side debt analysts are present, debt returns do not lag equity returns at all. In the AA category, for example, the coefficient on lagged equity returns when there is debt analyst following is indistinguishable from zero at -0.002. In the intermediate four credit rating categories, lagged return coefficients interacted with debt following $DF_{it} x\ Ret^{E}_{i,t-1}$, three have negative signs, but none are statistically different from zero. It is interesting to note that bonds in the intermediate categories tend to exhibit higher contemporaneous correlation with equity returns, lower serial cross-correlation with lagged equity returns, and in the case of BB bonds, higher serial cross-correlation with lead equity returns. Overall, we find that the effect of sell-side debt research on the lead-lag relation between debt and equity returns is prevalent, and especially pronounced in the opposite ends of the credit rating. Exploring explanations for this pattern is left for future research.[13]

Johnston et al. (2008) document that companies that issue large amounts of debt attract more analyst following. If debt market inefficiency is negatively correlated with the amount of public debt outstanding, a conjecture borne out in untabulated analyses, then the documented negative relation between debt market inefficiency and debt analyst following could be spurious. To address this concern, we sort all day *t* observations based on a company's total par value of debt outstanding on day *t*, and assign them to three groups with approximately the same number of observations; Small, Medium and Large Debt Market, and conduct our analyses of equation 3 on each group. Results are reported in Panel B of Table 7.

We find that debt analyst following reduces the lag with which debt returns impound information for Small and Medium Debt Market. The coefficient on the interaction term between debt following and lagged equity returns in the Small Debt subsample is economically and statistically significant at -0.032. The corresponding coefficient in the Medium sample is -0.023, statistically significant at 10%. The evidence strongly rejects the alternative hypothesis that the effect of debt analyst following on the lag with which debt returns impound information is a spurious one. The evidence also suggests that debt analysts matter the most when the size of the debt market is small or medium, perhaps, due to the lack of alternative information sources.

[13] There is a measurement error-based explanation for this result. We measure debt coverage based on reports provided to Investext by 15 (not all) brokers. If the other brokers are especially active in their coverage of bonds rated in intermediate categories, then more bonds would be classified incorrectly as lacking coverage, which would reduce the power of our tests. See Johnston et al. (2008) for some evidence that bonds rated BBB, BB, and B tend to receive relatively more debt coverage.

It is important to comment on the fact that the pattern in the coefficients on lead equity returns mirrors the pattern in the coefficients on lagged equity returns. In particular, we find that the coefficient on lead equity returns decrease monotonically as the size of the debt market increases. This result does not mean that a large debt market leads to higher equity market efficiency. In untabulated analysis, we find that the correlation between total par value of debt outstanding and equity capitalization is 44%, which means that partitioning the sample by the size of the debt market also partitions the sample by the size of the equity market. Hence, our explanation of the evidence that the efficiency of debt market and equity market increase in the size of the debt market is that companies that issue a lot of debt are also likely to issue a lot of equity, and thus, have richer information environment.

It is possible that analysts do not make prices more efficient, but simply choose to follow companies whose debt is priced efficiently for other reasons. Precluding this hypothesis requires that we control for all known and potential determinants of the lead-lag relation between company debt and equity. Our results do not change when we (i) remove convertible bonds, found by Downing et al. (2008) to lag equity returns the most and (ii) partition the sample by the frequency with which company bonds trade or the liquidity of company bonds. [14] While these results may still be biased due to omitting an unknown correlated variable, it is important to interpret them in conjunction with the event study evidence. The alternative hypothesis that debt analysts do not make debt prices more efficient, but choose to follow companies whose debt prices are efficiently priced for other reasons is hard to reconcile with the evidence that the publication of a debt report leads to higher absolute returns and trading volume in both debt and equity markets (Table 3). We believe that the combined evidence that markets respond to the dissemination of investment research and that the lead-lag relation between debt and equity prices

[14] We use two measures of liquidity to partition the sample: (1) Our first measure is the inverse of Amihud's (2002) illiquidity measure: the ratio of daily absolute return to volume. (2) Our second measure is the number of days a company's bonds trade in a month. We calculate liquidity using observations from the prior month. We allocate observations into low, medium and high liquidity groups using 33% and 66% breakpoints of the corresponding distribution.

depends on analyst following is consistent only with the general hypothesis that analysts influence price formation and investor behavior.

5. Conclusions

We comprehensively examine the effects of sell-side debt reports on security markets. Our sample includes 921 companies with publicly traded debt and equity over the period from 2002 through 2004. 429 of the sample firms have debt analyst research coverage. We document that the publication of debt reports leads to higher absolute debt and equity returns, covariance in debt and equity returns, total face value of debt traded and equity turnover. We conclude that sell-side debt analysts provide new information to debt and equity markets and influence trading behavior in both markets.

Using the empirical framework of Kwan (1996), we document that debt market inefficiency is a general phenomenon that is reduced, but not eliminated by the existence of debt analysts. We conclude that debt analysts play a role in speeding up the process by which debt markets impound publicly available information.

While the study's major contribution is establishing the distinct informational role of debt analysts in security markets, the study also contributes to understanding the informational role of sell-side research in general. In particular, sell-side debt research influences debt and equity prices just like equity research influences debt and equity prices. This result, in conjunction with recent institutional evidence that firms are encouraging information flows between debt analysts and equity analysts, and between debt and equity analysts and investors active in both debt and equity markets poses a challenge for regulators who subject equity research to considerably more regulations than debt research. As the distinction between debt and equity research gets blurred, is it sensible to regulate debt and equity research differently?

Our evidence has also some implications for the regulatory debate about the role of credit rating agencies in security markets. As argued by Beaver et al. (2006), the increased use of credit ratings in contracting has made them less useful for valuation purposes as they respond to information with a delay.

On the other hand, the activities of sell-side debt and equity analysts are geared exclusively toward the production and quick dissemination of information useful for valuation. Moreover, our evidence that debt reports and equity recommendations influence both debt and equity prices, while credit ratings influence only equity prices, supports the idea that information markets have found a way to provide information useful for valuation purposes, albeit by different information intermediaries, sell-side debt and equity analysts. Perhaps, changes in how credit ratings are used and regulated have stimulated the demand and supply of investment research by sell-side analysts. If this is the case, then any cost-benefit analysis of proposed new regulations of the credit ratings agencies should consider how other information intermediaries would be affected.

Finally, the documented dependence of the lead-lag relation between debt and equity returns on the activities of information intermediaries should be of interest to researchers studying the relative pricing of corporate securities and the profitability of capital structure arbitrage strategies (Duarte et al., 2005; Schaefer and Strebulaev, 2006). Our evidence suggests that relative mispricing and the profitability of strategies aimed at eliminating it are likely to be the highest among companies with little or no existing debt and equity analyst following.

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Appendix 1. Variable Definitions

Variable	Definition
	Information events
DR_{it}	A binary variable indicating a debt report release at day *t* for firm *i.* (Source: Investext)
ER_{it}	A binary variable indicating an equity recommendation release at day *t* for firm *i*. (Source: IBES)
ΔCR_{it}	A binary variable indicating a credit rating change at day *t* for firm *i*. The ratings are based on the cardinal scale described in Appendix 2. (Source: FISD)
EA_{it}	A binary variable indicating earnings release. The earnings release dates (RDQT) are obtained from CRSP/Compustat Merged Database.
	Market Reactions (REACT)
$BondRet_{it}$	Risk free rate adjusted bond portfolio return standardized by mean and standard deviation that are calculated using no-event days. Bond returns are calculated using flat prices (Source: TRACE) and coupon amounts/frequency information (Source: FISD).
$BondVol_{it}$	Bond portfolio's traded quantity standardized by mean and standard deviation that are calculated using all days. (Source: TRACE)
$BondAbsRet_{it}$	Absolute value of risk free rate adjusted bond portfolio return standardized by mean and standard deviation that are calculated using all days.
$EquityRet_{it}$	Value weighted market return adjusted equity return standardized by mean and standard deviation that are calculated using all days. Equity returns of securities with CRSP share code 10 and 11 are used. (Source: CRSP)
$EquityVol_{it}$	Turnover (Equity trading volume divided by number of shares outstanding) standardized by mean and standard deviation that are calculated using all days. (Source: CRSP)
$EquityAbsRet_{it}$	Absolute value of value weighted market return adjusted equity return standardized by mean and standard deviation that are calculated using all days.
COV_{it}	Product of daily value weighted market return adjusted equity return and risk free rate adjusted bond portfolio return standardized by mean and standard deviation that are calculated using all days.

Appendix 1. Variable Definitions, Cont.

Variable	Definition
	Lead Lag Analyses Variables
Ret_{it}^{RF}	Daily risk free rate of one month Treasury Bill (Source: WRDS – Fama French Factors Database)
Ret_{it}^{E}	Daily raw equity return (Source: CRSP)
Ret_{it}^{B}	Daily raw bond portfolio return (Source: TRACE and FISD)
EF_{it}	A binary variable that takes a value of 1 if equity coverage (number of analysts with a recommendation in prior calendar year) of firm *i* at time *t* exceeds the median equity coverage in prior calendar year. If no equity recommendation was released within the past calendar year, we assume zero analysts.
DF_{it}	A binary variable that takes a value of 1 if firm *i* at time t has an outstanding debt report within the last year.
	Other variables
Leverage	Book value of debt (data9 +data34) scaled by book value of asset (data6). (Source: CRSP/Compustat Merged Database.)
Equity Capitalization	Market value of equity (data25*data199). (Source: CRSP/Compustat Merged Database)
Market to Book	Equity market value divided by book equity value ((data25*data199)/data 60) (Source: CRSP/Compustat Merged Database.)
Total Asset Size	Book value of assets (data6) (Source: CRSP/Compustat Merged Database.)

Appendix 2. Credit Rating Scales

In this appendix, we summarize the credit ratings issued by the four rating agencies - Standard and Poor's, Moody's, Fitch, and Duff and Phelps- that issue ratings as reported by FISD. We follow Jorion, Liu and Shi (2005) to assign cardinal scales to rating classes.

Moody's	S&P	DPR	Fitch	Cardinal Scale	Group
Aaa	AAA	AAA	AAA	23	1
Aa/Aa1	AA+	AA+	AA+	22	2
Aa2	AA	AA	AA	21	2
Aa3	AA-	AA-	AA-	20	2
A/A1	A+	A+	A+	19	3
A2	A	A	A	18	3
A3	A-	A-	A-	17	3
Baa/Baa1	BBB+	BBB+	BBB+	16	4
Baa2	BBB	BBB	BBB	15	4
Baa3	BBB-	BBB-	BBB-	14	4
Ba/Ba1	BB+	BB+	BB+	13	5
Ba2	BB	BB	BB	12	5
Ba3	BB-	BB-	BB-	11	5
B/B1	B+	B+	B+	10	6
B2	B	B	B	9	6
B3	B-	B-	B-	8	6
Caa/Caa1	CCC+	CCC	CCC+	7	7
Caa2	CCC		CCC	6	7
Caa3	CCC-		CCC-	5	7
Ca	CC		CC	4	7
C	C		C	3	7
P-1	D	DD	D/DD/DDD	1	7
Not Rated	Not Rated	Not Rated	Not Rated		8

Table 1. Sample Selection and Company Characteristics

Panel A of this table summarizes the number of bond issuers left after each step of our sample selection procedure. The sample period is between 2002 July and 2004 December. Panel B summarizes various attributes (credit rating, leverage, equity capitalization, market to book, and total asset size) of firms with and without debt reports. The reported attributes are: **Number of bonds traded**: Daily number of bonds traded (Trace database Quantity item). **Credit rating:** Using the FISD credit rating data from all credit agencies, we converted all ratings into a scale between 1 (worst) - 23 (best) using the cardinal scales in Appendix 2. **Leverage:** Book Value of Debt **(**Compustat (data9 +data34))/ Book Value of Asset (data6)). **Equity capitalization:** Market value of equity (Compustat (data25*data199). **Market to book:** Equity market value divided by book equity value. **Total asset size**: Book value of assets (Compustat (data6)). Panel C reports cross-sectional mean, median, and standard deviation of company-specific means and standard deviations of our daily market reaction variables - absolute and signed debt returns, total par value of debt traded in billions (volume), absolute and signed equity returns, equity turnover, and covariation in debt and equity returns. Return variables and equity turnover in Panel C are represented in percentages.

Panel A. Sample Selection

Total Number of Bond Issuers between July 1, 2002-Dec 31,2004 from TRACE	2,705
Bond issuers that have issued bond and equity	1,139
Number of parent matched bond issuers with debt report	328
Number of parent matched bond issuers without debt report	99
Number of subsidiary matched bond issuers with debt report	311
Number of subsidiary matched bond issuers without debt report	401

Panel B. Company Characteristics

	With debt research (429 Companies, 3194 Bonds)		Without debt research (492 Companies, 1884 Bonds)	
	Mean	Median	Mean	Median
Number of bonds traded	21,222,862	5,100,000	5,838,978	1,201,000
Credit rating	14.36	15.00	13.70	15.00
Leverage	0.32	0.28	0.26	0.24
Equity capitalization	14,416	5,133	6,705	1,944
Market to book	2.78	1.98	7.15	1.96
Total asset size	39,592	8,985	11,254	2,492

Panel C. Descriptive Statistics on Absolute Return, Volume, Volatility, Covariation

		BondAbsRet	*BondVol*	*BondRet*	*EquityAbsRet*	*EquityVol*	*EquityRet*	*COV*
Mean	Mean	0.9786	6.8725	0.0872	1.6183	0.7937	0.0336	0.0077
	Median	0.7821	2.7602	0.0459	1.3086	0.5778	0.0356	0.0009
	STD	0.7447	16.2000	0.5198	0.9497	0.8630	0.1210	0.0468
STD	Mean	1.0726	8.6087	1.4559	1.7574	0.8763	2.3974	0.0415
	Median	0.8612	4.3164	1.1969	1.3270	0.4823	1.8748	0.0172
	STD	0.9244	14.1000	1.1272	1.3325	2.6659	1.6213	0.1093
	Number of Firms	795	884	795	921	921	921	783
	Number of Observations	111,465	138,233	111,465	549,515	549,547	549,515	108,658

Table 2. Information Events

In Panel A of this table, we report aggregate number of information events as defined in section 4.1.3. In Panel B, we report cross-sectional distribution of information events for companies. In Panel C, we report the Probit estimates of equation (4). In this equation, the dependent variable, *Debt Report*, is a binary variable that takes a value of 1 if there is a debt report at day t. Independent variables - *Debt Report, Equity Recommendation,* Δ*Credit Rating, and Earnings Announcement* - are binary variables that take a value of 1 if there is a debt report, equity recommendation, credit rating change, or earnings announcement, respectively, in the specified time period. The incremental probability is calculated using the probability on a no-information date. The probability of having a debt report on a non event day is 0.3041%. P-values are based on robust standard errors clustered by day.

Panel A. Aggregate Information Events

Information event	Total	*BondAbsRet*	*BondVol*	*EquityAbsRet*	*EquityVol*	*COV*
Debt Report	2,758	1,117	1,235	2,726	2,726	1,114
Equity Recommendation	26,749	7,179	8,329	26,728	26,730	7,178
Δ*Credit Rating*	4,920	1,976	2,203	4,613	4,617	1930
Earnings Announcement	8,062	1,684	2,054	8,010	8,010	1,681

Panel B. Cross-sectional Distribution of Information Events for Companies

	Debt Report	Equity Recommendation	ΔCredit Rating	Earnings Announcement
Mean	2.99	29.04	5.34	8.75
Median	0.00	27.00	3.00	10.00
STD	5.86	21.08	10.53	2.95
Q25	0.00	13.00	1.00	10.00
Q75	3.00	41.00	6.00	10.00

Panel C. Debt Report and its Covariates (N=270,270, Pseudo R^2=0.1550)

	Coefficient	P-value	Incremental Probability
Intercept	-2.743	[0.000]	
Debt Report $_{t-1,t-5}$	0.254	[0.000]	0.420
Debt Report $_{t-5,t-10}$	0.292	[0.000]	0.482
Equity Recommendation $_{t}$	0.300	[0.000]	0.494
Equity Recommendation $_{t-1,t-5}$	-0.016	[0.392]	-0.026
Equity Recommendation $_{t-5,t-10}$	0.037	[0.049]	0.061
Equity Recommendation $_{t+1,t+5}$	0.126	[0.000]	0.207
Equity Recommendation $_{t+6,t+10}$	0.018	[0.341]	0.030
Δ*Credit Rating* $_{t}$	0.346	[0.000]	0.571
Δ*Credit Rating*$_{t-1,t-5}$	0.133	[0.000]	0.219
Δ*Credit Rating*$_{t-5,t-10}$	0.072	[0.039]	0.120
Δ*Credit Rating*$_{t+1,t+5}$	0.112	[0.001]	0.184
Δ*Credit Rating*$_{t+6,t+10}$	0.032	[0.371]	0.052
Earnings Announcement $_{t}$	1.312	[0.000]	2.166
Earnings Announcement $_{t-1,t-5}$	0.779	[0.000]	1.286
Earnings Announcement $_{t-5,t-10}$	0.411	[0.000]	0.679
Earnings Announcement $_{t+1,t+5}$	0.104	[0.002]	0.171
Earnings Announcement $_{t+6,t+10}$	0.111	[0.001]	0.184

Table 3. Market Reactions to Debt Reports in Event Time

Panel A of this table provides average market reaction in bond and equity markets between days -5 and +10 around debt report release. Market reaction metric includes *BondAbsRet*, *BondVol*, *EquityAbsRet*, *EquityVol* and covariation between bond and equity returns. Panel B presents the event windows determined for corresponding information events and market reaction metric. Panel C presents average market reaction in bond and equity markets between days -5 and +10 around debt report release after excluding other information event days in their corresponding event windows. The reported values in Panel A and Panel C are the mean of the corresponding measures. Number of Event Days is the number of day 0 non-overlapping events used in the calculation of average market reaction. (***), (**), and (*) represent statistical significance at 1, 5 and 10% level.

Panel A. Market Reaction to Debt Reports in Event Time: All

Event Day	*BondAbsRet*	*BondVol*	*EquityAbsRet*	*EquityVol*	*COV*
-5	-0.013	0.000	0.006	0.012	-0.023
-4	0.028	0.045	0.010	0.037*	0.017
-3	0.020	0.092**	0.069***	0.126***	0.009
-2	0.040	0.134***	0.127***	0.222***	-0.001
-1	0.020	0.262***	0.408***	0.587***	0.031
0	0.061*	0.293***	0.540***	0.759***	0.124**
1	-0.041	0.236***	0.148***	0.468***	0.057*
2	-0.030	0.131***	0.020	0.268***	-0.020
3	-0.013	0.133***	-0.046**	0.165***	0.053*
4	-0.051*	0.145***	-0.020	0.136***	-0.018
5	-0.079***	0.083***	-0.054***	0.103***	0.047*
6	-0.095***	0.032	-0.05***	0.087***	-0.018
7	0.025	0.052*	-0.044**	0.042**	-0.004
8	-0.002	0.042	-0.081***	0.027*	-0.006
9	-0.001	0.024	-0.088***	0.035**	-0.040*
# of event days	671	745	1742	1742	668

Panel B. Events windows

	BondAbsRet	*BondVol*	*EquityAbsRet*	*EquityVol*	*COV*
Debt Report	[1]	[-3 , 5]	[-3 , 1]	[-4 , 9]	[0 , 1]
Equity Recommendation	[1]	[-1 , 1]	[-3 , 1]	[-3 , 9]	[1]
ΔCredit Rating	[0 , 1]	[-2 , 9]	[-2 , 1]	[-4 , 6]	[1]
Earnings Announcement	[1]	[0 , 5]	[-1 , 3]	[-1 , 6]	[0 , 1]

Panel C. Market Reaction to Debt Reports in Event Time: Excluding Observations in Proximity to Other Information Events

Event Day	*BondAbsRet*	*BondVol*	*EquityAbsRet*	*EquityVol*	*COV*
-5	-0.022	-0.030	-0.030	-0.107***	-0.028
-4	0.030	-0.023	-0.032	-0.131***	0.017
-3	0.012	0.035	-0.013	-0.056**	0.005
-2	0.033	0.027	-0.008	0.023	0.000
-1	0.012	0.040	0.133***	0.193***	0.016
0	0.075*	0.143**	0.281***	0.289***	0.090
1	-0.065**	0.184***	0.030	0.137**	0.043
2	-0.035	0.065	-0.035	0.000	-0.026
3	-0.010	0.072	-0.069***	-0.041	0.068**
4	-0.056*	0.084*	-0.048**	-0.020	-0.030
5	-0.076***	0.016	-0.072***	-0.09***	0.047*
6	-0.102***	-0.018	-0.078***	-0.069**	-0.016
7	0.024	-0.016	-0.067***	-0.088***	-0.008
8	-0.009	-0.010	-0.095***	-0.11***	-0.015
9	0.003	-0.033	-0.104***	-0.083***	-0.039
# of event days	524	**263**	692	319	407

Table 4. Market Reaction to Publication of Debt Reports and Competing Information Events

In this table, Panel A reports univariate descriptive statistics on market reaction metrics for a one day information event window. Panel B provides OLS estimates of equation (1) using one day information event window. Unit of analysis is firm-day return. The left hand side variable is indicated at the heading of each column and defined in Section 3.1. The regressors are binary variables defining the information event days based on existence of a debt report, equity recommendation, credit rating change, and earnings announcement. Panel C provides OLS estimates of Equation (1) using information event windows defined based on Table 3, Panel B evidence. Standard errors are clustered by day. p-values are provided in brackets. (***), (**), and (*) represent statistical significance at 1, 5 and 10% level.

Panel A. Descriptive Statistics on Market Reaction Metrics at One Day Information Event Window

	BondAbsRet		*BondVol*		*EquityAbsRet*		*EquityVol*		*COV*	
Information event	Mean	STD	Mean	STD	Mean	STD	Mean	STD	Mean	STD
Debt Report	0.0712	0.9930	0.4339	1.4073	0.5067	1.4516	0.8221	1.5282	0.1232	1.2454
Equity Recommendation	0.0465	0.9744	0.0902	1.0535	0.4019	1.3223	0.5322	1.3389	0.0678	1.1054
ΔCredit Rating	0.0085	0.9526	0.2570	1.2206	0.0448	1.0399	0.2313	1.1805	0.0087	0.8143
Earnings Announcement	0.0422	0.9462	0.3017	1.2393	0.7903	1.5815	0.9312	1.4534	0.1494	1.4780

Panel B. One-day event windows

	BondAbsRet	*BondVol*	*EquityAbsRet*	*EquityVol*	*COV*
Debt Report	0.067**	0.384***	0.382***	0.641***	0.097**
	[0.021]	[0.000]	[0.000]	[0.000]	[0.010]
Equity Recommendation	0.059***	0.091***	0.446***	0.548***	0.073***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
ΔCredit Rating	0.026	0.345***	0.167***	0.322***	0.025
	[0.256]	[0.000]	[0.000]	[0.000]	[0.185]
Earnings Announcement	0.044*	0.277***	0.806***	0.905***	0.143***
	[0.080]	[0.000]	[0.000]	[0.000]	[0.000]
Intercept	-0.016**	-0.026***	-0.072***	-0.053***	-0.012***
	[0.044]	[0.002]	[0.000]	[0.000]	[0.000]
N	111,425	138,171	549,515	549,547	108,621
R^2	0.000	0.006	0.025	0.044	0.001

Panel C. Event Windows Based on Evidence of Market Reaction in Panel B, Table 3

	BondAbsRet	*BondVol*	*EquityAbsRet*	*EquityVol*	*COV*
Debt Report	0.056*	0.139***	0.134***	0.104***	0.062**
	[0.057]	[0.000]	[0.000]	[0.000]	[0.021]
Equity Recommendation	0.055***	0.070***	0.205***	0.140***	0.066***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Δ*Credit Rating*	0.026	0.150***	0.124***	0.120***	0.025
	[0.253]	[0.000]	[0.000]	[0.000]	[0.185]
Earnings Announcement	0.051***	0.116***	0.362***	0.369***	0.112***
	[0.009]	[0.000]	[0.000]	[0.000]	[0.000]
Intercept	-0.016**	-0.051***	-0.094***	-0.120***	-0.013***
	[0.036]	[0.000]	[0.000]	[0.000]	[0.000]
N	111,425	138,171	549,515	549,547	108,621
R^2	0.000	0.007	0.02	0.034	0.001

Table 5. Covariation in Debt and Equity Returns Conditional on Credit Rating

This table provides OLS estimates of equation (1) for 8 different groups created based on credit rating cardinal scales described in Appendix 2. Unit of analysis is firm-day. Left hand side variable is covariation between equity and bond returns as defined in section 3.1. The regressors are binary variables defining the information event days based on existence of a debt report, equity recommendation, credit rating change, and earnings announcement. Standard errors are clustered by day. P-values are provided in brackets. (***), (**), and (*) represent statistical significance at 1, 5 and 10% level.

	AAA	AA	A	BBB	BB	B	CCC to D	Not Rated
Debt Report	0.382*	0.172**	0.061	0.028	0.094	0.022	-0.148*	0.049
	[0.052]	[0.038]	[0.264]	[0.501]	[0.297]	[0.762]	[0.084]	[0.885]
Equity Recommendation	0.058	0.041	0.053**	0.041	0.217***	0.047	0.103	0.123**
	[0.446]	[0.243]	[0.019]	[0.132]	[0.000]	[0.287]	[0.161]	[0.033]
Δ*Credit Rating*	0.024	-0.031	0.041	-0.054	0.083	0.142*	0.251*	-0.018
	[0.842]	[0.328]	[0.252]	[0.449]	[0.418]	[0.069]	[0.097]	[0.791]
Earnings Announcement	-0.05	-0.034	0.052	0.136***	0.173*	0.360***	-0.002	0.359***
	[0.756]	[0.555]	[0.228]	[0.004]	[0.076]	*[0.000]*	[0.987]	[0.002]
Intercept	0.011	-0.006	-0.006	-0.015***	-0.037***	-0.039***	-0.006	-0.019
	[0.471]	[0.416]	[0.203]	[0.007]	[0.000]	[0.000]	[0.687]	[0.131]
N	3,477	16,001	38,692	23,201	8,658	8,852	3,507	6,233
R^2	0.003	0.001	0.001	0.001	0.007	0.008	0.003	0.007

Table 6. The Effect of Debt Following on the Lead-Lag relation in Debt and Equity Returns

Panel A of this table provides sample statistics of variables used in estimation of equation (2) and (3). Unit of analysis is firm-day return. $Ret_{i,t}^{B}$ denotes the bond return on day *t*. $Ret_{i,t}^{E}$ denotes the equity return on day *t*. $Ret_{i,t}^{RF}$ is the daily risk free return. $Ret_{i,t}^{B}$, $Ret_{i,t}^{E}$and $Ret_{i,t}^{RF}$ are represented in percentages in Panel A. *EF* and *DF* are binary variables representing equity and debt following respectively. *DF* takes a value of 1 if firm *i* at time t has an outstanding debt report within the last year. *EF* takes a value of 1 if equity coverage (number of analysts with a recommendation in prior calendar year) of firm *i* at time *t* exceeds the median equity coverage in prior calendar year. Panel B provides OLS estimates of equation (2) and (3). The left hand side variable is $Ret_{i,t}^{B}$, raw bond return at day *t*. Standard errors are clustered by day. P-values are provided in brackets. (***), (**), and (*) represent statistical significance at 1, 5 and 10% level.

Panel A. Sample statistics of variables used in Lead/Lag relation analysis

	Ret^{B}	Ret^{E}	Ret^{RF}	EF	DF
Mean	0.0575	0.1085	0.0048	0.769	0.663
Median	0.0288	0.0533	0.0050	1.000	1.000
STD	1.4180	2.4191	0.0013	0.421	0.473
P5	-1.6104	-2.9630	0.0030	0.000	0.000
P95	1.8404	3.2983	0.0070	1.000	1.000
Min	-99.9999	-52.8250	0.0030	0.000	0.000
Max	27.7720	150.0000	0.0070	1.000	1.000

Panel B. Lead-Lag Analysis

	Ret_{it}^{B}	Ret_{it}^{B}
ΔRet_{it}^{RF}	-48.794	-48.632
	[0.266]	[0.266]
$Ret_{i,t+1}^{E}$	0.008*	0.018***
	[0.062]	[0.010]
$Ret_{i,t}^{E}$	0.073***	0.073***
	[0.000]	[0.000]
$Ret_{i,t-1}^{E}$	0.050***	0.064***
	[0.000]	[0.000]
$EF_{it} x\ Ret_{i,t+1}^{E}$		-0.015*
		[0.073]
$DF_{it} x\ Ret_{i,t-1}^{E}$		-0.022***
		[0.005]
Intercept	0.000***	0.000***
	[0.000]	[0.000]
N	108,405	108,405
R^2	0.023	0.024

Table 7. Cross-sectional Variation in the Effect of Debt Following on the Lead-Lag relation

Panel A provides estimates of equation (3) for 8 different groups created based on credit rating cardinal scales described in Appendix 2. Unit of analysis is firm-day return. $Ret_{i,t}^{B}$ denotes the bond return on day t. $Ret_{i,t}^{E}$ denotes the equity return on day t. $Ret_{i,t}^{RF}$ is the daily risk free return. The left hand side variable is bond return at day t. EF and DF are binary variables representing equity and debt following respectively. DF takes a value of 1 if firm i at time t has an outstanding debt report within the last year. EF takes a value of 1 if equity coverage (number of analysts with a recommendation in prior calendar year) of firm i at time t exceeds the median equity coverage in prior calendar year. In Panel B, we estimate the same equation for 3 groups created based on outstanding debt size. In this panel, "average number of companies" refers to time series average of number of companies in the corresponding size group. Similarly, "total par value of debt outstanding" refers to the time series average of total outstanding debt of corresponding size group. Standard errors are clustered by day. P-values are provided in brackets. (***), (**), and (*) represent statistical significance at 1, 5 and 10% level.

Panel A. The Role of Credit Ratings

	AAA	AA	A	BBB	BB	B	CCC to D	Not Rated
ΔRet_{it}^{RF}	-285.937***	-32.679	-130.440***	-38.69	74.275	122.261**	-149.729	-28.511
	[0.009]	[0.491]	[0.007]	[0.524]	[0.168]	[0.041]	[0.357]	[0.606]
$Ret_{i,t+1}^{E}$	-0.07	0.007	-0.008	0.025	0.037**	0.009	0.031	0.041
	[0.274]	[0.835]	[0.504]	[0.170]	[0.042]	[0.315]	[0.250]	[0.184]
$Ret_{i,t}^{E}$	0.062***	0.001	0.029***	0.057***	0.114***	0.094***	0.112***	0.099***
	[0.008]	[0.853]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
$Ret_{i,t-1}^{E}$	0.132***	0.073**	0.040***	0.037***	0.066***	0.061***	0.084***	0.068***
	[0.001]	[0.037]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
$EF_{it} x\ Ret_{i,t+1}^{E}$	0.035	-0.009	0.003	-0.021	-0.046*	0.006	-0.014	-0.019
	[0.597]	[0.796]	[0.794]	[0.291]	[0.080]	[0.638]	[0.633]	[0.563]
$DF_{it} x\ Ret_{i,t-1}^{E}$	-0.107**	-0.075**	-0.017*	-0.008	0.021	-0.016	-0.014	-0.044**
	[0.020]	[0.036]	[0.079]	[0.533]	[0.231]	[0.317]	[0.614]	[0.046]
Intercept	0.000*	0.000***	0.001***	0.000***	0	0.000**	0.001*	0.000**
	[0.070]	[0.000]	[0.000]	[0.004]	[0.461]	[0.041]	[0.053]	[0.033]
N	3,471	15,979	38,636	23,150	8,641	8,819	3,493	6,216
R^2	0.037	0.005	0.004	0.012	0.073	0.053	0.058	0.032

Panel B. The Role of Debt Market Size

	Small	Medium	Large
ΔRet_{it}^{RF}	-25.633	-47.877	-70.853
	[0.651]	[0.266]	[0.145]
$Ret_{i,t+1}^{E}$	0.023**	0.020*	-0.009
	[0.019]	[0.075]	[0.480]
$Ret_{i,t}^{E}$	0.078***	0.079***	0.058***
	[0.000]	[0.000]	[0.000]
$Ret_{i,t-1}^{E}$	0.068***	0.059***	0.052***
	[0.000]	[0.000]	[0.002]
$EF_{it} x\ Ret_{i,t+1}^{E}$	-0.014	-0.022	0.012
	[0.279]	[0.104]	[0.394]
$DF_{it} x\ Ret_{i,t-1}^{E}$	-0.032**	-0.023*	0.001
	[0.010]	[0.069]	[0.967]
Intercept	0.001***	0.000***	0.000***
	[0.000]	[0.001]	[0.001]
N	35,756	35,385	37,264
R^2	0.026	0.02	0.03
Average number of firms	57.68	58.33	60.62
Total par value of debt outstanding (in billions)	1.800	4.543	22.4