Understanding the Illiquidity of Corporate Bonds: The Arrival of Public News

Hao Jiang and Zheng Sun*

This Draft: October 2013

Abstract

Whereas the illiquidity of corporate bonds is well recognized, its source is not well understood. In this paper, we use the arrival of firm-specific public news to gauge the importance of asymmetric information in shaping the illiquidity in corporate bond markets. We find that trading volume in corporate bonds increases by 21%; the reversal of short-term bond returns decreases by 42% after controlling for the increase in volume; and the contemporaneous price impact of order flows decreases by 28% on days when public news arrives. Moreover, although large (small) buys of corporate bonds on average associate with higher (lower) future bond returns, such trades that occur on public news days have no return predictive power. Finally, firms with high news counts tend to issue bonds with yields 0.93% (1.28%) lower than firms with low (no) news counts. These results point to the notion that public news tends to resolve information asymmetry between informed and uninformed traders, thereby reducing the illiquidity in corporate bond markets.

JEL classification: G12

Keywords: Corporate Bond Market; Public Firm News; Information Asymmetry; Liquidity; Trading Volume; Bond Return; Order Imbalance.

*Hao Jiang is from Unversity of Texas at Austin and Erasmus University. Phone: 512-232-6758. E-mail: hao.jiang77@gmail.com. Zheng Sun is from Paul Merage School of Business, University of California, Irvine. Phone: 1-949-824-6907. Email: zsun@merage.uci.edu. We thank seminar participants at UC Irvine, and RavenPack for their assistance with data. All remaining errors are ours.

1. Introduction

Despite the enormous amount of corporate bonds outstanding, the U.S. corporate bond market is characterized with high illiquidity. In 2012 the average daily turnover in the corporate bond market is approximately one-third of that of the equity market.[1] The illiquidity of corporate bonds has been shown to significantly impact firms' cost of debt.[2] Despite the importance of bond market illiquidity, factors that contribute to the corporate bond illiquidity remain poorly understood. In this paper, we empirically examine the importance of asymmetric information in determining the liquidity in corporate bond markets.

Theories that attribute illiquidity to asymmetric information have long been established. In pioneering microstructure models such as Glosten and Milgrom (1985) and Kyle (1985), the illiquidity of assets increases with the degree of information asymmetry between informed and uninformed traders. Empirically, there has been extensive evidence on the importance of asymmetric information on liquidity for equity market. (E.g., Easley et al., 1996).

Is asymmetric information important for bond market liquidity? On one hand, with predetermined cash flows, the value of bond bonds may be less sensitive to information than that of equity. On the other hand, corporate bond markets are dominated by institutional traders, and recent literature shows that institutional trading tends to be information driven (e.g., Barber et al., 2009). One appealing feature of corporate bond markets for informed traders is the inverse relation between trade size and trading costs, i.e., large bond traders tend to pay lower execution costs (Edwards, Harris, and Piwowar, 2007). If traders with private information prefer to act quickly on their information by placing large orders (Easley and O'Hara, 1987), the corporate bond markets may appear particularly attractive and the channel of asymmetric information could be important in shaping the illiquidity of corporate bonds.[3]

[1] According to Wall Street Journal (titled "Large Institution Discuss New Marketplace for Bonds"), in 2012, the total market values for the corporate bond market and the equity market are $8.1 and $17 trillion, respectively. The corresponding average daily trading volumes are $17.9 billion and $112.9 billion. The average turnover is calculated as daily trading volume/total market value.

[2] See e.g., Longstaff, Mithal and Neis (2005), Chen, Lesmond, Wei (2007), Mahanti et al.(2008), and Bao, Pan and Wang (2009).

[3] Ample evidence of informed trading in the corporate bond market exists. For example, in 2008, Delphi Corporation accused investors of insider trading, alleging that at least one of its seventeen institutional investors shorted its bonds after receiving confidential information on the firm's bankruptcy exit financing. Kedia and

To quantify the impact of information asymmetry on the illiquidity of corporate bonds, we use the release of firm-specific news as our identification strategy. Our key premise is that the release of firm-specific news can change firms' information environment, resulting in changes in the degree of information asymmetry. Thus, studying patterns of bond trading and prices around public news release may offer an interesting setting to understand the effect of information asymmetry on liquidity.

Motivated by the theoretical microstructure literature, our paper examines various dimensions of corporate bond illiquidity including trading volume, the short-term reversal of corporate bond returns, and contemporaneous price impact of order flows. Among others, Wang (1994) shows that asymmetric information between informed and uninformed traders could generate an adverse selection problem, leading to reduced trading volume. Return reversal is also commonly used to capture illiquidity, with a stronger reversal reflecting higher illiquidity. The source of liquidity-driven return reversal can arise from the channels of market maker's inventory costs (risk) as well as information asymmetry. In the particular context of public news arrival, Tetlock (2010) builds on Wang (1994) and Llorente et al. (2002), and shows that the arrival of public news provides sunshine to liquidity-driven trades by informed traders. As a result of reduced information asymmetry, the cost of liquidity provision by uninformed traders declines and the return reversal is weakened. Our last measure of illiquidity is the price impact of contemporaneous order flow, or the Kyle's (1985) lambda, It reflects the information content of order flows and is therefore a direct measure of asymmetric information component of illiquidity.

Our data combine a complete record of corporate bond trades as reported by the TRACE with a comprehensive firm-specific news data set from the Dow Jones News Wire in the period 2003—2011. We examine how corporate news arrival impacts the illiquidity of corporate bonds. Our tests show that the illiquidity of corporate bonds is substantially reduced on days with public firm news. First, trading volume in corporate bonds shoots up by 21% on days when firm-specific news arrives. Second, the reversal of short-term bond returns decreases by 42%, after controlling for the surge in trading volume. Finally, the contemporaneous price impact of

Zhou (2013), Wei and Zhou (2012) present evidence of informed trading in corporate bonds prior to corporate takeover and earnings announcements, respectively.

order flows decreases by 28% on corporate news days.

Consistent with the intuition that bond values are more sensitive to credit-related and negative news, especially for high-yield bonds, we also find that the effect of public news on bond liquidity is stronger for credit-related news, negative news, and high-yield bonds. These results support the hypothesis that corporate news releases alleviate information asymmetry among traders, leading to reduced illiquidity of corporate bonds.

In theory, the illiquidity of corporate bonds can arise from channels other than asymmetric information. For example, if news releases generate more portfolio rebalancing trades from both buyers and sellers, market makers may incur a lower cost of inventory management, therefore quoting more favorable prices to bond traders. This in turn could lead to lower return reversal. To further validate the information asymmetry channel, we seek more direct evidence that public news release resolves information asymmetry among traders. Specifically, we take advantage of two features of corporate bond markets. First, institutional bond traders tend to trade substantially larger amounts than individual bond traders due to the lower transaction costs enjoyed by the institutional traders. Therefore, we could relatively accurately categorize trades as institutional versus individual trades based on trade sizes. This has been more difficult for the equity market, where large investor orders are often broken up into small trades, which impounds noise into classifications based on trade size (Cready, Kumas, and Subasi, 2013). Second, unlike equity market, bond dealers are required to report trading direction information, making it possible to evaluate the information content of each trades executed with dealers.

Based on these observations, we examine how the arrival of public news influences the interaction between small and large traders. Consistent with the view that informed traders tend to place large orders, we find that large (small) buys of corporate bonds on average associate with higher (lower) subsequent bond returns. However, both types of trades that occur on public news days show no return predictive power. In combination, these results point to the notion that the arrival of public news tends to resolve information asymmetry between informed and uninformed traders, thereby reducing the illiquidity in corporate bond markets.

Finally, as improved corporate bond liquidity could impact bond prices, we examine the

relationship between the number of news stories for a given firm and its cost of public debt. Our results indicate that compared with firms with high news counts, the yield spread (ie. corpond bond yield – matching maturity Treasury yield) of the bonds issued by firms with low and zero news counts are 0.93% and 1.28% higher, respectively. After controlling for all bond and firm characteristics, the difference in the costs of debt between firms with high and low news counts remains statistically significant and economically meaningful.

Our paper joins a growing literature that seeks to understand the liquidity of corporate bond markets. The empirical literature has emphasized the effect of limited price transparency—a characteristic for OTC markets—on corporate bond illiquidity. Biais and Green (2006) compare trading costs in the current market to costs before the World War II (WWII) when bonds were actively traded on exchanges, and find that the average trading costs for bond holders were significantly lower during the pre-WWII period. Edwards, Harris, and Piwowar (2007), Bessembinder, Maxwell, and Venkataraman (2006), and Goldstein, Hotchkiss, and Sirri (2007) show that transaction costs for corporate bonds decrease after the introduction of TRACE, a practice that improves the bond market transparency. Feldhutter (2012) shows that the relative bargaining power for customers and dealers depends on trade size. Our paper is one of the first that shows the importance of information asymmetry in driving corporate bond market illiquidity. In light of recent evidence that a subset of credit holders tend to be informed and trade aggressively on their private information (see e.g., Ivashina and Sun,2011; Kedia and Zhou, 2013; Wei and Zhou, 2012), it is reasonable to believe that information asymmetry contributes to the bond market illiquidity. Using public news release as a source of variation to firms' information asymmetry, we find that it is associated with increasing bond trading activity, decreasing return reversal and price impact of order flow, which suggests that information asymmetry has a significant impact of bond market liquidity.

Our study also contributes to an emerging literature studying whether public news resolves information asymmetry. The literature has two views on the issue. Under the first view, public information reduces the information advantage of the informed investors, which encourage uninformed investors to participate in trading (Kacperczyk and Seru, 2007; Tetlock, 2010). Under the second view, investors have different ability to interpret the same information especially

the soft information. Therefore public release of information provides informed investors with opportunities to outsmart uninformed investors (Kandel and Pearson, 1995; Engelberg, Reed, and Ringgenberg, 2012). Our paper finds that order flow of large size trades is positively associated with future bond returns, while order flow of small size trades is negatively associated with future returns. This is consistent with the existing literature suggesting that informed investors in the corporate bond market are likely to trade in large sizes (Wei and Zhou, 2012). However, we find that the return predictability of large size order flow decreases during the news period, while return predictability of small size order flow increases during the news period. Therefore, the arrival of public information appears to reduce the information advantage of the informed investors in the corporate bond market.

The remainder of the paper proceeds as follows. Section 2 describes the databases used in this study. Section 3 presents our analyses on news arrival and corporate bond liquidity. Section 4 provides direct evidence of reduction of information asymmetry upon news arrivals. Section 5 examines the relation between the frequency of news and corporate yield spread. Finally, Section 6 concludes.

2. Data and Summary Statistics

Our study combines two main databases, the first on bond transactions and prices, and the second on news articles from the Dow Jones News Service. Specifically, we use the enhanced TRACE database to get information on the corporate bond transactions and prices.[4] On July 1, 2002, NASD (FINRA as of July 2007) initiated TRACE. The system is introduced in stages, and by February 7, 2005, it covers over 99% of trading activities in the US corporate bond market. The database contains information about bond transaction date, time, price and size, among other things. We supplement the enhanced TRACE data with Mergent's Fixed Income Securities Database (FISD), which provides extensive bond-specific information including credit rating histories. Following the literature, we remove canceled and corrected

[4]Enhanced TRACE is a newer version of TRACE data that are recently made available to academics. It covers basically the same information as the original TRACE data, but has several improvements. First, it reports the actual trading volume as appose to a capped amount. Second, it provides the trading direction information and an indicator of between-dealer trades for the entire sample period of TRACE.

trades from TRACE. We also exclude the commission trades and inter-dealer trades. We include only fixed-rate bonds, and exclude bonds that are putable, convertible, perpetual, exchangeable, and have announced calls. We also exclude asset-backed issues, yankees, Canadian, issues denominated in foreign-currency, as well as issues offered globally. Finally, we require the issuing firms have at least one news story in the news database. Our sample period spans from July, 1, 2002 to June 30, 2011. Our final sample contains 6069 bonds issued by 704 firms.

Our public news data comes from RavenPack News Analytics, which covers all news stories from the Dow Jones News Service over our sample period. For every news story that mentions a company, RavenPack provides a relevance score between 0-100, indicating how closely the underlying news applies to a particular company. A score of 0 means the entity was passively mentioned while a score of 100 means the entity was predominant in the news story. We require a news story have a relevance score of at least 90 to be included in the sample. Firms release public financial news quite often. On average, a bond has at least one news report every four trading days. Panel B of Table 1 reports the statistics of the news coverage. On average, 38% of the bonds are covered by the news sample, which account for 50% of the total value of the bond market. This fraction appears low as compared with the news coverage for the equity market. For instance, Tetlock (2010) find that after 1996 the news data covers over 95% of the firms in the equity market. The main reason for a bond without news coverage is that the bond is issued by a private firm which does not generate any public news. In our sample, only 7% of the bonds that are covered by the news sample are issued by private firms.

RavenPack groups news into several categories. In our sample, there are 27 news categories for companies. However, some of the news category only applies to a small subset of firms and are not representative news for the entire market. Since we are interested in the general effect of typical news to the bond market, we exclude news categories that cover less than 1% of the news sample.[5] We also exclude news categories that depict stock market behavior such as stock-prices, insider trading, order-imbalances. These stock market behaviors are not fundamental information about a company per se, but are likely to be investors' reaction to

[5]Specifically we exclude news categories: corporate responsibility, exploration, indexes, industrial-accidents, legal, marketing, partnership, price-targets, regulatory, security and taxes. We include bankruptcy and credit news for their clear relevance for bond traders.

other fundamental information. Finally, we exclude the investor-relations category. The news covered under this category are either that the company schedules a conference call to report financial results or other corporate information, or that the company schedules a meeting of the board of directors or shareholders. Since the news is about the timing of the conference calls or meetings, rather than actual information revealed in the meetings, they are less likely to contain fundamental information about a firm. Panel C presents a final list of the news categories we exploit in analyses and the number of firms covered by each category.

3. News Arrival and Corporate Bond Liquidity

3.1. News Arrival and Trading Activity

We start our analysis by looking at the response of traders in corporate bond markets to the arrival of public news. In theories that link information asymmetry to trading volume (e.g., Wang, 1994), informed investors could trade for both information and liquidity reasons. Since uninformed investors cannot perfectly identify the informed investors' motive behind their trades, they face the risk of trading against informed investor's private information, which discourages them from providing liquidity to informed investors. If public news resolves information asymmetry between the two classes of investors, the adverse selection problem of the uninformed investors could be alleviated, and trading volume may increase.

We first examine whether the likelihood of bond trading increases on news days using the logit model. We conduct the analysis on both firm and bond level, with the unit of observations being firm-day and bond-day, respectively. The key independent variable is an indicator variable that takes a value of one if there is public news for a given firm on a specific day, and zero otherwise. For the firm level analysis, the dependent variable equals one if there is at least one transaction for any bonds issued by the firm during the day. The advantage of the firm level analysis is that it accounts for potential correlated trading within a day among multiple bonds issued by the same firm. To control for bond specific characteristics, we also perform bond level analysis, where the dependent variable equal to one if a given bond is traded during the day.

To mitigate the effect of within-firm correlation, we cluster the standard errors by firm.

We control for a number of bond and firm characteristics. The bond level characteristics include the bond's issuing size, ratings, maturity, age and coupon rates. The firm level characteristics include issuer's stock market capitalization, firms' sales, Long-term debt to asset ratio, and return on assets. Finally, to control for unknown persistent firm characteristics that might influence bond trading and secular trends in bond trading, we include both firm and month fixed effects in the firm-level regressions.

Table II reports the regression results. Unconditionally, we find that the probability of trading increases from 51% for no-news days to 66% for news days. After controlling for month and firm fixed effects, the probability of bond trading is still 10% higher on news days than no news days. When we further control for the firm and bond characteristics, the marginal effect of news on bond trading is reduced to 2%, but remains statistically significant.

Not only that the trading frequency increases on news days, our results also establish that trading volume in corporate bonds shoots up on days when public news arrives. Specifically, Table III presents the regression results of the natural log of daily turnover ratio in corporate bonds on an indicator variable that equals one on days with public firm-specific news and zero otherwise. We again conduct both firm-level and bond-level analyses. The firm-level analysis aggregates the trading volume of individual bonds issued by the firm, which is divided by the sum of notional amounts outstanding. The results of Panel A of Table III indicate that, on average, the trading volume in corporate bonds issued by a firm shoots up by 20.8% when firm-specific news arrives in the market. This effect is highly statistically significant with a t-statistic of 17.04. Even when we control for the influence of bond size, market cap of firm equity, firm sales, leverage ratio, and return on assets (ROA), the arrival of public news still associates with a 19.0% increase in corporate bond trading with a t-statistic of 16.58. The effect is quantitatively and statistically similar when we consider the abnormal bond turnover, which is defined as difference between the natural log of the turnover ratio for a bond in a given day and the bond's average log turnover ratio during the previous 180 trading day.

Bond-level analysis also indicates strong reaction of bond traders to the arrival of public

firm news. On average, the arrival of public news associates with an increase of turnover in corporate bonds by 8.9%, which is statistically significant with a t-statistic of 4.50.

We also consider the differential effects of different types of news on corporate bond trading. If the arrival of public news increases trading volume by resolving information asymmetry, then the effect should be stronger when the news contains more value relevant information for bond investors. Several tests provide supportive evidence. First, we group news into credit related and non-credit related news. The credit related news includes four sub-categories: analyst-ratings, bankruptcy, credit and credit-ratings. We find, indeed, that the average turnover ratio increases by 25.0% when credit-related news hits the corporate bond market, which is approximately two thirds higher than the 15.0% increase in bond trading when other types of news arrive in the market.

Second, we separately examine negative versus positive news events. To sign the news, we use PEQ and ESS scores provided RavenPack. PEQ is a variable that represents the news sentiment of the given news story according to the presence of positive and negative words and phrases in a news story. PEQ takes values of 0, 50, or 100 indicating negative, neutral or positive news, respectively. In our sample, 5.53% of the news stories have a PEQ score of 0 and 11.82% of the news have a PEQ score of 100. RavenPack provides another variable, ESS, which is based on the linguistic content or sentiment of the news story. It has a value between 0 and 100 with a higher value corresponding to more positive sentiment. We combine both variables to sign a new story. The story is considered positive if its PEQ score is 100 or its ESS score is above 75 (top 10% of the ESS score). A news story is attributed as negative if its PEQ score is 0 or its ESS score is less than 35(bottom 10% of the ESS score). Consistent with negative information being more relevant for bond values, we find that negative firm news leads to larger increases in corporate bond trading. Third, we find that scheduled firm news associates with larger increases in corporate bond trading. Fourth, we find that high-yield bonds react more strongly to public firm news in trading than investment-grade bonds.

Finally, we look at the value relevance of firm-specific news through bond return volatility. We proxy for daily return volatility using the absolute value of daily abnormal returns, defined as the difference between a bond's return in a given day and an equal-weighted average return

of a bond portfolio matched by maturity and bond rating. Table IV shows that the arrival of news stories about a firm associates with increased bond return volatility. Intuitively, we find that credit-related news and negative news associate with stronger reaction from bond markets; moreover, the prices of high-yield bonds are more sensitive to the arrival of news stories about their issuers. In summary, we find strong evidence of reaction of bond traders to the arrival of firm-specific news and the value-relevance of the news stories.

Why does trading volume increase on corporate news days? In addition to the release of public news resolving information asymmetry and thereby increasing the propensity of uninformed investors to trade, we note other possible channels as well. For instance, if investors have different interpretations of the same public information, the arrival of public news could increase the difference in opinions among investors, which leads to more active trading. Also, the increased trading volume could be due to more protfolio rebalancing trades from both buyers and sellers. To better differentiate the information and non-information channel, in the subsequent two subsections we consider the impact of firm news on other liquiditiy measures.

3.2. News Arrival and Short-term Return Reversal

In this subsection, we consider the influence of public firm news on the illiquidity of corporate bonds, as captured by the short-term reversal in corporate bond returns. The idea of exploiting the autocovariance structure in asset returns to capture illiquidity dates back at least to Roll (1984), who shows that the asset illiquidity, such as static bid-ask spreads, leads to negative autocovariance in observed asset returns. More recently, Bao, Pan, and Wang (2011) provide a comprehensive analysis using the reversal in short-term corporate bond return as their key measure of illiquidity.

We hypothesize that public firm news could reduce information asymmetry among bond traders, and provide sunshine to risk-averse liquidity-driven trades. As a result, liquidity providers in corporate bond markets are willing to charge a lower premium for their liquidity provision, which reduces the return reversal in the subsequent period.

Specifically, we perform the following regression:

$$R^i_{t+2,t+10} = \alpha + \beta_1 \times R^i_t + \beta_2 \times News^i_t + \beta_3 \times (R^i_t \times News^i_t) + \gamma \times controls + \epsilon^i_{t+2,t+10}, \quad (1)$$

where $R^i_{t+2,t+10}$ is the cumulative abnormal return for bond or firm i from $t+2$ to $t+10$, and R^i_t is its abnormal return on day t.[6] To compute bond return, we follow the "trade size-weighted" method recommended by Bessembinder el al. (2009), where the daily price is calculated by weighting each trade during a day by its size. This approach puts more weight on the institutional trades that incur lower transaction costs and should more accurately reflect the underlying true price of the bond.[7] The abnormal bond return is computed as the difference between bond returns on date t and the weighted average return of a bond portfolio matched by maturity and bond rating. For firm-level analysis, we value-weight the abnormal returns on bonds issued by the firm on the basis of the notional amount outstanding. The key independent variable, $News_t$, is a dummy variable that takes a value of 1 if there is a record of public firm-specific news on day t. The control variables include the natural log of the amount of the bonds outstanding, the log equity market value, the log of firm sales, long-term debt to asset ratio, return on assets, the bond's time to maturity, and the age and coupon rate of the bond. Firm and month fixed effects are also included. We cluster standard errors on the firm level. Finally, for the easiness of interpretation, we standardize all independent variables, except for the news event dummy, to have means of 0 and standard deviations of 1.

The first column in Panel A of Table V indicates that the coefficient for the bond return is -0.049 and statistically significant, which is consistent with the short-term reversal in corporate bond returns. The coefficient for the interaction term the bond return and news arrival is 0.018 and statistically significant. This result indicates that the arrival of public firm news weakens the reversal of bond returns by 37%.

[6] We follow Tetlock (2010) by skipping the day $t+1$ return to reduce the impact of bid-ask bounce. Including the return on day $t+1$ in tests of return reversal provides qualitatively similar results.

[7] Harris and Piwowar (2006) and Bessembinder et al. (2009) argue that computing the daily return based on last transaction price may introduce excessive noise on days when the last trade is small. Edwards, Harris, and Piwowar (2007) find that average execution cost for a small retail trade ($5000) is 75 basis points (bps), compared to an average cost for a large institutional trade ($10 MM) of only 4 bps. The difference in trading costs by the size of the trade can have a very significant impact on return calculation, given the small magnitude of daily bond returns.

In addition to information asymmetry, another force that could drive day-to-day variation of short-term return reversal is dealers' inventory costs (e.g., Amihud and Mendelson, 1980). Typically, dealers would like to maintain a preferred level of inventory. The ease to manage inventory often relies on the order arrival rates. We find that trading volume increases on news days. If the increased trading volume is due to more portfolio rebalancing trades from both buyers and sellers, the market makers could quote more favorable prices. This in turn could lead to improved liquidity and lower return reversal.

To examine this conjecture, in the second column, we include the interaction between the bond return and abnormal turnover in the regression. The result shows that the surge in trading volume indeed reduces the short-term return reversal, however the effect of news on return reversal is largely intact. In terms of magnitudes, the arrival of public firm news is on average equivalent to a 4-standard deviation increase in abnormal turnover ratio in weakening the short-term reversal. In the third and fourth columns, we show the results for the bond-level analysis, which are weaker but still economically meaningful and statistically significant.

In Panel B of Table V, we break down corporate news to credit events and non-credit events, sign the news to be positive and negative news, and group bonds to investment-grade and high-yield bonds. The pattern we document is fairly robust across the subsamples. The effect of news on return reversal is stronger for credit-related news, negative news and for high-yield. These results indicate that the arrival of public news tends to reduce the illiquidity of corporate bonds.

3.3. News Arrival and Price Impact of Order Flows

We also examine how the arrival of public news influences the contemporaneous price impact of order flows in corporate bonds. Specifically, we perform the following regression:

$$R_t^i = \alpha + \beta_1 \times Orderimbalance_t^i + \beta_2 \times News_t^i + \beta_3 \times (Orderimbalance_t^i \times News_t^i) + \gamma \times controls + \epsilon_t^i, \quad (2)$$

where the dependent variable is the abnormal return on bond i at day t. The abnormal bond return is computed as the difference between bond return on date t and the weighted average return of a bond portfolio matched by maturity and bond rating. Following Hasbrouck (2009), we compute the order imbalance as the square root of daily net dollar volumes, i.e., daily buy volume minus daily sell volume, which is then signed by the trading direction of the net volume. All independent variables except for the news event dummy are standardized to have means of 0 and standard deviations of 1.

The first column in Panel A of Table VI shows a one-standard deviation increase in order imbalance increases daily bond abnormal return by 14.9 basis points on no news days. However, the price impact of order flow is reduced by 4.2 basis points on news days, which is statistically significant. In combination, these results show that the arrival of public firm news reduces the price impact of order flow by 28%. In the second column of Panel A, we include control variables such as the bond size, firm's equity size, firm sales, leverage and profitability (ROA). The effect of news arrival on the price impact of contemporaneous order flows remains intact. In Panel B of Table VI, we consider subsamples partitioned on the basis of credit and non-credit events; positive and negative news; investment-grade and high-yield bonds. The results indicate that the reduction of the price impact of contemporaneous order flows on corporate news days is fairly robust.

3.4. News Arrival and Information Asymmetry

In the previous section, we show that liquidity increases on news days, which is consistent with public news reducing asymmetric information. In this section, we seek more direct evidence for the resolution of information asymmetry. To gain more insights into the variation in the information content of order flows in corporate bonds surrounding the arrival of public news, we classify transactions in corporate bonds into small and large trades and compute the corresponding order flows. A trade is classified as institutional if the trading volume is higher than or equal to $500,000. Specifically, we perform the following regressions to examine the information content of order flows:

$$R^i_{t+2,t+10} = \alpha + \beta_1 \times Flows^{i,j}_t + \beta_2 \times News^i_t + \beta_3 \times (Flows^{i,j}_t \times News^i_t) + \gamma \times controls + \epsilon^i_{t+2,t+10}, \quad (3)$$

where $R^i_{t+2,t+10}$ is the cumulative abnormal return for bond or firm i from $t+2$ to $t+10$ and $Flows^{i,j}_t$ is the order flow of bond i for a given type of trader j (small or large) on day t.

The results in Table VII show that on average large buys (sells) of corporate bonds associate with higher bond (lower) returns. In contrast, small buys (sells) of corporate bonds associate with lower bond (higher) returns. This result is consistent with the intuition that informed traders in corporate bond markets tend to place large orders and their trades tend to profitable at the expense of small bond traders. Interestingly though, neither large nor small buys that occur on corporate news days have future return predictive power. These results suggest that the arrival of public information tends to resolve information asymmetry between small and large traders.

4. The Number of News Stories and Yield Spreads

In the preceding sections, we report evidence of improved corporate bond liquidity due to reduced information asymmetry on days when public firm-specific news arrives. In this section, we examine the relationship between the number of news stories for a given firm and the prices of corporate bonds. As improved corporate bond liquidity could impact bond prices, we hypothesize that firms with more news stories tend to enjoy a lower cost of debt.

In each quarter, we calculate the average number of news stories per day for each firm, and assign firms into one of the three groups: Group One includes firms that report no news during the quarter; Group Two includes firms whose news counts are below the median number of news stories for all sample firms during the quarter; and Group Three includes firms whose news counts are above the median news counts.[8] We then conduct the following regression:

[8]Our data report much more news stories for public firms. To address the concern that our results may be driven by systematic differences in bond yields between private and public firms, we only consider public companies for this part of the analysis.

$$Yield\ Spread_t^i = \alpha + \beta_1 \times No\ News_t^i + \beta_2 \times Low\ News_t^i + \gamma \times controls + \epsilon_t^i, \qquad (4)$$

where $Yield\ Spread$ is the difference between the corporate bond yield and the yield of a comparable maturity treasury bond. For Treasury yields, we use the constant maturity rate published by the Federal Reserve and use linear interpolation whenever necessary. $No\ News$ is an indicator variable that takes a value of one if a firm belongs to Group One and zero otherwise, $Low\ News$ is an indicator variable that takes a value of one if a firm belongs to Group Two and zero otherwise.[9]

Our selection of the control variables follows Chen, Lesmond and Wei (2007) and Han and Zhou (2013). In particular, we include both bond level and firm level characteristics. Bond level characteristics include bond ratings,[10] natural log of the bond issuing amount, time to maturity, coupon rate, and age. Firm level characteristics include return on assets, standard deviation of daily stock return during the quarter, Long term debt to asset ratio, pre-tax interest coverage, total debt to capital ratio, operating income/sales, bid-ask spread of stock prices, and log(sales). We also include time and firm fixed effect.

Table VIII reports the regression results, which show a strong relation between the number of news stories about a firm and its cost of debt. Compared with firms with high news counts, the yield spreads of the bonds issued by firms with low and zero news counts are 0.93% and 1.28% higher, respectively. After controlling for all bond and firm characteristics, there are still significant differences in bond yield spreads between firms with high and low news counts. Perhaps due to the strong persistence of news count variables, the inclusion of firm fixed effects reduces the magnitude of the difference in yield spreads. However, the difference in the costs of debt between firms with high and low news counts remains statistically significant and economically meaningful.

[9] As a robustness check, we also conduct a regression of yield spread of quarter t+1 on the number of news stories of quarter t, the results are qualitatively similar.

[10] Following the literature, we assign a numeric value to each Moody's rating letter, with 1, 2, 3..., denoting Aaa, Aa1, Aa2,..., , respectively. We also conduct regressions with rating fixed effect, our results are qualitatively similar.

5. Conclusion

In this paper, we have used the arrival of firm-specific public news to gauge the importance of asymmetric information in shaping the illiquidity in corporate bond markets. We find that trading volume in corporate bonds shoots up by 21% on days when public firm-specific news arrives; the reversal of short-term bond returns decreases by 42% after controlling for the increase in volume; and the contemporaneous price impact of order flows decreases by 28% on corporate news days. Moreover, although large (small) buys of corporate bonds on average associate with higher (lower) future bond returns, such trades that occur on public news days have no return predictive power. Finally, firms with high news counts tend to issue bonds with yields 0.93% (1.28%) lower than firms with low (no) news counts. These results point to the notion that public news tends to resolve information asymmetry between informed and uninformed traders, thereby reducing the illiquidity in corporate bond markets.

Many practioners and researchers have recognized the pressing need to understand the illiquidity of corporate bond markets. The focus of the current debate has been on the effect of (trading) transpancy on bond liquidity. In this paper, we discovered corporate transpancy as a promising avenue to increase bond liquidity, which has important implication for both corporate and public policies.

References

Barber, Brad, Yi-Tsung Lee, Yu-Jane Liu, and Terrance Odean, 2009, Just how much do individual investors lose by trading? Review of Financial Studies 22, 609–632.

Bao, Jack, Jun Pan, and Jiang Wang, 2011, The illiquidity of corporate bonds, The Journal of Finance 66, 911–946.

Bessembinder, Hendrik, Kathleen Kahle, William Maxwell, and Danielle Xu, 2009, Measuring Abnormal Bond Performance, The Review of Financial Studies 22, 4219–4258.

Bessembinder, Hendrik, William Maxwell, Kumar Venkataraman, 2006, Market transparency, liquidity externalities, and institutional trading costs in corporate bonds, Journal of Financial Economics 82, 251–288.

Biais, Bruno, Richard Green, 2006, The Microstructure of the Bond Market in the 20th Century, Working paper.

Chan, Wesley, 2003, Stock price reaction to news and no-news: drift and reversal after headlines, Journal of Financial Economics 70, 223–260.

Chen, Long, David Lesmond, and Jason Wei, 2007, Corporate yield spreads and bond liquidity, The Journal of Finance 62, 119–149.

Cready, William, Abdullah Kumas, and Musa Subasi, 2013, Transaction sizes and institutional investor trading patterns around earnings announcements, University of Taxas at Dallas working paper.

Easley, David, and Maureen O'Hara, 1987, Price, trade size, and information in securities markets, Journal of Financial Economics 19, 69–90.

Easley, David, Nicholas Kiefer, Maureen O'hara, and Joseph Paperman, 1996, Liquidity, Information, and Infrequently Traded Stocks, Journal of Finance 51, 1405–1436.

Edwards, Amy, Lawrence Harris, and Michael S. Piwowar, 2007, The Journal of Finance 62, 1421–1451.

Engelberg Joseph, Adam Reed, and Matthew Ringgenberg, 2012, How are shorts informed? Short sellers, news, and information processing, Journal of Financial Economics, Forthcoming.

Feldhutter, Peter, 2012, The same bond at different prices: Identifying search frictions and selling pressures, Review of Financial Studies 25, 1155–1206.

Glosten, Lawrence, and Paul Milgrom, 1985, Bid, ask and transaction prices in a specialist market with heterogeneously informed traders, Journal of Financial Economics 14, 71–100.

Goldstein, Michael, Edith Hotchkiss, and Erik Sirri, 2007, Transparency and liquidity: a controlled experiment on corporate bonds, Review of Financial Studies 20, 235–273.

Han, Song, and Xing Zhou 2013, Informed Bond Trading, Corporate Yield Spreads, an d Corporate Default Prediction, Management Science forthcoming.

Hasbrouck, Joel, 2009, Trading costs and returns for US equities: estimating effective costs from daily data, Journal of Finance 64, 1445–1477.

Ivashina, Victoria, and Zheng Sun, 2011, Institutional Stock Trading on Loan Market Information, Journal of Financial Economics 100, 284–303.

Kacperczyk, M., Seru, A., 2007, Fund manager user of public information: New evidence on managerial skills, Journal of Finance 62, 485–528.

Kandel, Eugene, and Neil Pearson, 1995, Differential interpretation of public signals and trade in speculative markets, The Journal of Political Economy 103, 831–872.

Kedia, Simi, and Xing Zhou, 2012, Informed Trading around Acquisitions: Evidence from Corporate Bonds, Journal of Financial Markets, forthcoming.

Kyle, Albert, 1985, Continuous auction and insider trading, Econometrica 53, 1315–1336.

Longstaff, F., S.Mithal, and E. Neis, 2005, Corporate Yield Spreads: Default Risk or Liquidity? New Evidence from the Credit-Default-Swap Market, Journal of Finance 60, 2213–53.

Mahanti, S., A. Nashikkar,M. G. Subrahmanyam, G. Chacko, and G.Mallik, 2008, Latent Liquidity: A New Measure of Liquidity, with an Application to Corporate Bonds, Journal of Financial Economics 88, 272–98.

Roll, Richard, 1984, A Simple Implicit Measure of the Effective Bid-Ask Spread in an Efficient Market, Journal of Finance 39, 1127–1139.

Tetlock, Paul, 2010, Does Public Financial News Resolve Asymmetric Information?, Review of Financial Studies 23, 3520–3557.

Wang, Jiang, 1994, A Model of Competitive Stock Trading Volume, Journal of Political Economy 102, 127–168.

Wei, Jason, and Xing Zhou, 2012, Informed trading in corporate bonds prior to earnings announcements, working paper.

Table I: Summary Statistics

This table reports the summary statistics of our news and bond sample. Panel A reports the firm and bond level statistics of the variables used in the paper. Daily bond returns are winsorized at top and bottom 1% level. Trading vol. and turnover are winsorized at top 1% level. Panel B reports statistics on news coverage. #Bonds is the time series average of the number of corporate bonds per day that meet the sample inclusion criteria and are covered by the news media. # Issuing Firms is the average number of bond issuing firms that are covered by the news media. Amount outstanding is the total principal amount of bonds issued by the firms with media coverage. We also report the bonds and firms covered by the news as a fraction of the all bonds that meet the sample inclusion criteria. In Panel C, we report the number of news events and the number of unique firms covered by each news category.

Panel A: Firm and Bond Level Statistics

Bond Level Statistics	N	Mean	Std Dev.	min	Q1	Median	Q3	max
Trade indicator (sample firms)	4,960,803	0.291	0.454	0	0	0	1	1
Trade indicator (all TRACE firms)	13,760,648	0.234	0.423	0	0	0	0	1
Number of trades per day conditional on trades (sample firms)	1,444,796	3.628	7.490	1	1	2	4	1,451
Number of trades per day conditional on trades (all TRACE firms)	3,219,789	3.272	7.164	1	1	2	7	5,312
Daily trading vol. conditional on trades ($1000, sample firms)	1,444,796	1,975.26	4,822.56	1	25	135	1,275	30,608
Daily trading vol. conditional on trades($1000, all TRACE firms)	3,219,789	1,641.54	4,449.16	1	20	78	830	30,608
Daily turnover conditional on trades (%, sample firms)	1,443,301	0.659	1.737	0.000	0.014	0.076	0.448	12.501
Daily turnover conditional on trades (%, all TRACE firms)	3,216,985	0.637	1.714	0.000	0.018	0.090	0.429	12.501
Daily Bond Return(bpts.)	4,954,736	0.774	81.486	-344.441	0.000	0.000	0.000	351.163
Abs (Daily Bond Return) (bpts.)	4,954,736	30.978	75.372	0.000	0.000	0.000	11.442	351.163
Log(Bond Size) ($1000)	4,943,374	10.864	2.278	0.000	8.819	11.918	12.612	15.320
Maturity (mo.)	4,960,803	106.471	120.012	0	31	68	140	1,182
Age (mo.)	4,714,281	58.410	45.384	0	25	47	80	322
Coupon (%)	4,714,281	5.785	2.179	0.000	5.125	6.000	7.000	13.500
Firm Level Statistics								
Log(Equity Size) ($1000)	951,359	15.254	1.584	6.873	14.293	15.246	16.337	19.508
Log(Firm Sales)	951,188	6.988	1.485	-0.437	5.965	7.028	8.006	11.664
Leverage	951,194	0.284	0.179	0.000	0.154	0.259	0.379	1.722
ROA (%)	951,090	0.009	0.031	-1.719	0.003	0.010	0.019	0.405

Panel B: News Coverage

	# Bonds	# Issuing firms	Amount outstanding ($b)	Fraction of bonds in TRACE	Fraction of firms in TRACE	Fraction of principal value of the market
Avg. Daily Statistics	2330	462	491.406	0.375	0.420	0.503

Panel C: News Coverage by News Category

News Category	N	#Firms	Percentage of News
acquisitions-mergers	83,352	637	6.29%
analyst-ratings	126,237	659	9.53%
assets	34,198	539	2.58%
bankruptcy	925	34	0.07%
credit	26,220	569	1.98%
credit-ratings	172,487	668	13.01%
dividends	52,713	517	3.98%
earnings	174,706	699	13.18%
equity-actions	57,829	657	4.36%
labor-issues	242,773	674	18.32%
products-services	276,577	667	20.87%
revenues	77,287	686	5.83%
Total	1,325,304	704	100%

Table II: News Arrival and the Likelihood of Corporate Bond Trading

This table presents the logistic regression modeling the likelihood of a bond trade during a day. The dependent variable is an indicator variable that takes a value of 1 if a bond is traded during the day. The key independent variable is a dummy variable that takes a value of 1 if there is a record of public finance news on the same day. The control variables include log of amount of bonds outstanding, log of equity market value, log of firm sales, Firm's Leverage, Firm's return on assets, bond's time to maturity, bond's age, and bond's coupon rate. Firm, month and rating fixed effects are included. Panel A presents the results for the whole sample, and Panel B presents the results for different sub samples. All control variables are standardized to 0 mean and unit standard deviation. The p-values of the Chi-square test are reported in italic. *** 1% significance, ** 5% significance, * 10% significance.

Panel A: Full Sample

	Firm Level Analysis				Bond Level Analysis			
	(1)		(2)		(3)		(4)	
News	0.124	***	0.125	***	0.081	***	0.088	***
p-value	*0.000*		0.000		*0.000*		*0.000*	
(Marginal Effect)	(0.103)		(0.019)		(0.038)		(0.017)	
Bond size			1.710	***			1.244	***
			0.000				*0.000*	
Equity Size			-0.115				0.101	**
			0.179				*0.038*	
Firm Sales			4.972	***			1.467	**
			0.000				*0.016*	
Leverage			-1.262	***			-0.756	***
			0.009				*0.000*	
ROA			-1.636	***			-0.752	***
			0.000				*0.000*	
Maturity							-0.373	***
							0.000	
Age							-0.100	***
							0.000	
Coupon							-0.228	***
							0.000	
Firm fixed effect	Yes		Yes		Yes		Yes	
Month fixed effect	Yes		Yes		Yes		Yes	
Rating Fixed effect					Yes		Yes	
N	1027823		945662		3030223		2858697	

Panel B: Sub-Samples

Firm Level Analysis												
	Credit Event		Non Credit Event		Good News		Bad News		Investment Grade		High Yield	
News	0.163	***	0.113	***	0.182	***	0.198	***	0.114	***	0.138	***
	0.000		*0.000*		*0.000*		*0.000*		*0.000*		*0.000*	
Marginal Effect	(0.033)		(0.017)		(0.030)		(0.039)		(0.011)		(0.005)	
Bond size	1.715	***	1.706	***	1.711	***	1.710	***	1.897	***	1.236	***
	0.000		*0.000*		*0.000*		*0.000*		0.000		0.000	
Equity Size	-0.099		-0.115		-0.108		-0.093		-0.023		-0.139	
	0.249		*0.181*		*0.207*		*0.278*		*0.850*		*0.148*	
Firm Sales	5.007	***	4.985	***	5.015	***	5.017	***	7.688	***	2.775	**
	0.000		*0.000*		*0.000*		*0.000*		*0.000*		*0.027*	
Leverage	-1.266	***	-1.264	***	-1.273	***	-1.275	***	-2.174	***	-0.487	
	0.009		*0.009*		*0.009*		*0.009*		*0.002*		*0.438*	
ROA	-1.642	***	-1.639	***	-1.645	***	-1.647	***	-1.108	***	-1.855	***
	0.000		*0.000*		*0.000*		*0.000*		*0.003*		*0.001*	
Firm fixed effect	Yes		Yes		Yes		Yes		Yes		Yes	
Month fixed effect	Yes		Yes		Yes		Yes		Yes		Yes	
N	945662		945662		945662		945662		574229		381591	

Table III: News Arrival and Trading Volume of Corporate Bonds

This table present results of regressions of bond turnover on the public news event dummy, along with control variables. The dependent variable for column (1), (2), (5) and (6) is log turnover (ie. log(trading volume/outstanding amount)), and that for column (3), (4), (7) and (8) is abnormal log turnover. The abnormal turnover is the difference between day t's log (turnover) of a bond and the bond's average log (turnover) between day t-180 and t-1. The key independent variable is a dummy variable that takes a value of 1 if there is a record of public finance news on day t. The control variables include log of amount of bonds outstanding, log of equity market value, log of firm sales, firm's leverage, firm's return on assets, bond's time to maturity, bond's age, and bond's coupon rate. Panel A presents the results for the whole sample, and Panel B presents the results for different sub samples. For Panel A, both firm level and bond level analysis results are presents. If an analysis is done on firm level, then the dependent variable is the average of the turnover of all bonds issued by a firm, weighted by each bond's notional amount outstanding. All control variables are standardized to 0 mean and unit standard deviation. Standard errors are clustered by firm. The t-statistics are reported in italic. *** 1% significance, ** 5% significance, * 10% significance.

Panel A: Full Sample

	Firm Level Analysis				Bond Level Analysis			
	Log(turnover)	Abnormal Log(turnover)	Log(turnover)	Abnormal Log(turnover)				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
News	0.208 ***	0.190 ***	0.172 ***	0.170 ***	0.089 ***	0.094 ***	0.086 ***	0.089 ***
t-statistic	*17.04*	*16.58*	*20.13*	*19.74*	*4.50*	*6.24*	*7.14*	*6.79*
Bond size		0.499 ***		-0.014		1.117 ***		-0.011 ***
		9.58		*-1.55*		*12.15*		*-2.87*
Equity Size		-0.200 **		-0.035 *		-0.198 **		-0.014
		-2.12		*-1.66*		*-2.13*		*-0.62*
Firm Sales		0.582 ***		-0.007		0.355 **		-0.040
		5.48		*-0.25*		*3.02*		*-0.88*
Leverage		0.216 ***		-0.005		0.069		-0.014
		4.68		*-0.38*		*1.28*		*-0.97*
ROA		-0.029 *		-0.002		-0.028 ***		-0.007
		-1.88		*-0.22*		*-2.62*		*-1.14*
Maturity						-0.178 ***		0.001
						-5.98		*0.29*
Age						-0.311 ***		0.029 ***
						-9.03		*7.24*
Coupon						0.212 ***		0.005
						2.65		*1.23*
Firm fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R2 (%)	26.63	27.42	0.78	0.76	16.48	21.58	0.29	0.31
N	1013331	940490	1013331	940490	4920143	3949029	4920143	3949029

Panel B: Sub-Samples

Firm Level Analysis: Dependent= Abnormal Log (turnover)												
	Credit Event		Non Credit Event		Good News		Bad News		Investment Grade		High Yield	
News	0.250	***	0.150	***	0.229	***	0.322	***	0.114	***	0.266	***
	17.05		*16.88*		*16.33*		*14.81*		*14.53*		*15.78*	
Bond size	-0.013		-0.013		-0.013		-0.013		-0.037	***	0.003	
	-1.50		*-1.51*		*-1.46*		*-1.49*		*-3.75*		*0.20*	
Equity Size	-0.035	*	-0.035	*	-0.038	*	-0.031		-0.034	*	-0.039	
	-1.68		*-1.68*		*-1.79*		*-1.47*		*-1.71*		*-1.23*	
Firm Sales	-0.004		-0.005		-0.003		-0.005		-0.010		0.039	
	-0.15		*-0.21*		*-0.11*		*-0.21*		*-0.34*		*1.05*	
Leverage	-0.005		-0.005		-0.004		-0.005		-0.011		0.005	
	-0.37		*-0.38*		*-0.35*		*-0.40*		*-0.62*		*0.31*	
ROA	-0.002		-0.002		-0.002		-0.002		-0.015	**	0.003	
	-0.22		*-0.24*		*-0.26*		*-0.18*		*-2.36*		*0.25*	
Firm fixed effect	Yes		Yes		Yes		Yes		Yes		Yes	
Month fixed effect	Yes		Yes		Yes		Yes		Yes		Yes	
R2 (%)	0.74		0.73		0.74		0.74		0.90		1.05	
N	940490		940490		940490		940490		574551		379635	

Table IV: News Arrival and Absolute Abnormal Return

This table presents results of regressions of absolute value of abnormal bond return on the public news event dummy, along with control variables. The abnormal bond return is computed as the difference between bond return on date t with the equal weighted average bond return of a portfolio matched by maturity and bond rating. The key independent variable is a dummy variable that takes a value of 1 if there is a record of public finance news on the same day. The control variables include log of amount of bonds outstanding, log of equity market value, log of firm sales, Firm's Leverage, Firm's return on assets, bond's time to maturity, bond's age, and bond's coupon rate. Firm, month and rating fixed effects are included. All independent variables except for the news event dummy are standardized to zero mean unit standard deviation variables. Column (1) and (2) presents results on the firm level analysis, where the abnormal bond return is computed as the average of abnormal bond return for all outstanding bonds for a firm, weighted by their outstanding notional amount. Column (3) and (4) presents results on bond level analysis. Firm and month fixed effects are included. The standard errors are clustered on the firm level. *** 1% significance, ** 5% significance, * 10% significance.

Panel A: Whole Sample

	Firm Level Analysis				Bond Level Analysis		
	(1)		(2)		(3)	(4)	
News	0.013	***	0.013	***	0.007	0.005	***
t-statistic	*7.96*		*7.74*		*1.56*	*2.77*	
Bond size			0.009			0.122	***
			1.58			*14.39*	
Equity Size			-0.054	***		-0.040	*
			-4.36			*-1.84*	
Firm Sales			0.003			-0.027	
			0.25			*-1.07*	
Leverage			0.021	**		0.006	
			2.47			*0.58*	
ROA			-0.002	*		-0.005	***
			-0.97			*-2.59*	
Maturity						0.022	***
						3.04	
Age						-0.019	***
						-2.87	
Coupon						0.029	***
						2.59	
Firm fixed effect	Yes		Yes		Yes	Yes	
Month fixed effect	Yes		Yes		Yes	Yes	
R2(%)	10.84		10.61		8.05	9.55	
N	1033610		959183		5177211	4125264	

Panel B: Sub-Samples

Firm Level Analysis												
	Credit Event		Non Credit Event		Good News		Bad News		Investment Grade		High Yield	
News	0.019	***	0.010	***	0.017	***	0.032	***	0.007	***	0.025	***
	7.41		*5.93*		*7.38*		*8.59*		*4.53*		*8.08*	
Bond size	0.009		0.009		0.009		0.009		-0.001		0.013	***
	1.58		*1.58*		*1.59*		*1.58*		*-0.11*		*1.52*	
Equity Size	-0.054	***	-0.054	***	-0.054	***	-0.053	***	-0.033	***	-0.054	***
	-4.36		*-4.36*		*-4.37*		*-4.32*		*-2.81*		*-3.22*	
Firm Sales	0.003		0.003		0.003		0.003		0.004		0.026	*
	0.27		*0.26*		*0.27*		*0.25*		*0.28*		*1.74*	
Leverage	0.021	**	0.021	**	0.021	**	0.021	**	0.014	**	0.031	**
	2.47		*2.47*		*2.47*		*2.46*		*2.10*		*2.35*	
ROA	-0.002		-0.002		-0.002		-0.002		-0.005	*	-0.001	
	-0.97		*-0.98*		*-0.98*		*-0.95*		*-1.88*		*-0.50*	
Firm fixed effect	Yes		Yes		Yes		Yes		Yes		Yes	
Month fixed effect	Yes		Yes		Yes		Yes		Yes		Yes	
R2 (%)	10.61		10.61		10.61		10.61		10.19		11.39	
N	959183		959183		959183		959183		588806		385166	

Table V: News Arrival and Reversal of Corporate Bond Returns

This table presents results of regressions of the model $R^i_{t+2.,t+10} = c_1 R^i_t + c_2 News^i_t + c_3 R^i_t \times News^i_t + controls$, where $R^i_{t+2,t+10}$ is cumulative abnormal return for bond i from t+2 to t+10. The abnormal bond return is computed as the difference between bond return on date t with the weighted average bond return of a portfolio matched by maturity and bond rating. The key independent variable $News^i_t$ is a dummy variable that takes a value of 1 if news arrives on day t for firm i. The control variables include log of amount of bonds outstanding, log of equity market value, log of firm sales, Firm's Leverage, Firm's return on assets, bond's time to maturity, bond's age, and bond's coupon rate. Firm, month and rating fixed effects are included. All independent variables except for the news event dummy are standardized to zero mean unit standard deviation variables. Column (1) and (2) presents results on the firm level analysis, where the abnormal bond return is computed as the average of abnormal bond return for all outstanding bonds for a firm, weighted by their outstanding notional amount. Column (3) and (4) presents results on bond level analysis. Firm and month fixed effects are included. The standard errors are clustered on the firm level. *** 1% significance, ** 5% significance, * 10% significance.

Panel A: Full Sample

	Firm Level Analysis				Bond Level Analysis			
	(1)		(2)		(3)		(4)	
Bond Return$_t$	-0.049	***	-0.055	***	-0.062	***	-0.068	***
t-statistic	*-20.37*		*-18.48*		*-27.69*		*-26.81*	
News$_t$	0.017	***	0.012	***	0.008	*	0.002	
	3.93		*2.81*		*1.77*		*0.68*	
Bond Return$_t$× News$_t$	0.018	***	0.023	***	0.009	**	0.018	***
	4.10		*4.62*		*2.41*		*4.61*	
Abnormal Turnover$_t$			0.006	***			0.005	***
			2.90				*3.13*	
Abnormal Turnover$_t$×Bond Return$_t$			0.006	***			0.005	***
			2.97				*3.14*	
Abnormal Turnover$_t$×News$_t$			0.010	**			-0.003	
			2.52				*-1.19*	
Abnormal Turnover$_t$×News$_t$* Bond Return$_t$			-0.002				-0.009	***
			-0.68				*-4.19*	
Bond size			0.005				0.010	*
			0.76				*1.66*	
Equity Size			0.002				0.018	
			0.09				*0.50*	
Firm Sales			0.005				-0.010	
			0.22				*-0.34*	
Leverage			0.019				0.001	
			1.27				*0.02*	
ROA			-0.016	**			-0.006	
			-2.11				*-1.23*	
Maturity							0.001	
							0.15	
Age							-0.008	
							-1.37	
Coupon							-0.008	
							-0.69	
Firm fixed effect	Yes		Yes		Yes		Yes	
Month fixed effect	Yes		Yes		Yes		Yes	
R2 (%)	1.44		1.45		1.26		1.09	
N	1003001		922979		4767783		3800187	

Panel B: Sub-Samples

Firm Level Analysis	Credit Event		Non Credit Event		Good News		Bad News		Invest. Grade		High Yield	
Bond Return$_t$	-0.051	***	-0.054	***	-0.050	***	-0.051	***	-0.062	***	-0.053	***
	-18.89		*-18.32*		*-18.72*		*-18.50*		*-17.37*		*-11.07*	
News$_t$	0.005		0.012	***	0.006		0.014		0.010	**	0.014	*
	0.76		*2.62*		*0.75*		*1.52*		*2.32*		*1.83*	
Bond Return (t)×News	0.034	***	0.021	***	0.011		0.033	*	0.024	***	0.032	***
	2.70		*4.17*		*0.95*		*1.90*		*4.49*		*3.05*	
Abnormal Turnover$_t$	0.008	***	0.006	***	0.008	***	0.008	***	0.005	**	0.006	
	3.93		*2.87*		*4.03*		*3.94*		*2.22*		*1.57*	
Abnormal Turnover$_t$×Bond Return$_t$	0.005	***	0.006	***	0.005	**	0.005	**	0.003		0.008	**
	2.74		*3.04*		*2.49*		*2.75*		*1.63*		*2.38*	
Abnormal Turnover$_t$×News$_t$	0.003		0.013	***	-0.003		0.003		0.010		0.010	
	0.33		*2.90*		*-0.47*		*0.24*		*2.22*		*1.39*	
Abnormal Turnover$_t$×News$_t$×Bond Return$_t$	-0.003		-0.003		0.009		-0.002		-0.001		-0.004	
	-0.30		*-0.84*		*1.03*		*-0.15*		*-0.18*		*-0.49*	
Bond size	0.005		0.005		0.005		0.005		0.014	*	-0.005	
	0.76		*0.76*		*0.76*		*0.76*		*1.67*		*-0.62*	
Equity Size	0.002		0.002		0.002		0.002		-0.032		-0.008	
	0.08		*0.09*		*0.08*		*0.09*		*-1.18*		*-0.22*	
Firm Sales	0.006		0.005		0.006		0.006		0.041		-0.013	
	0.25		*0.22*		*0.25*		*0.24*		*1.36*		*-0.33*	
Leverage	0.019		0.019		0.019		0.019		0.015		0.020	
	1.28		*1.27*		*1.28*		*1.28*		*1.24*		*0.83*	
ROA	-0.016	**	-0.016	**	-0.016	**	-0.016	**	0.004		-0.025	
	-2.12		*-2.12*		*-2.12*		*-2.12*		*0.65*		*-2.27*	
Firm fixed effect	Yes		Yes		Yes		Yes		Yes		Yes	
Month fixed effect	Yes		Yes		Yes		Yes		Yes		Yes	
R2 (%)	1.45		1.45		1.45		1.45		1.4		2.17	
N	922979		922979		922979		922979		566407		368673	

Table VI: Price Impact of Order Flows

The table presents results of regressions of the model $R_i^i = \lambda_1 (Signed\sqrt{DollarVolume})_t^i + \lambda_2 (Signed\sqrt{DollarVolume})_t^i \times News_t^i + \beta News_t^i + controls$ The dependent variable is abnormal return at day t. The abnormal bond return is computed as the difference between bond return on date t with the weighted average bond return of a portfolio matched by maturity and bond rating. $Signed\sqrt{DollarVolume}$ is the square root of daily net dollar volumes (ie. daily buy vol. - daily sell vol.), signed by the trading direction of the net volume. The buy and sell vol. are defined from the perspective of traders who has dealers as counterparties. All independent variables except for the news event dummy are standardized to zero mean unit standard deviation variables. The standard errors are clustered on the firm level. *** 1% significance, ** 5% significance, * 10% significance.

Panel A: Whole Sample

	(1)		(2)	
Order Imbalance$_t$	0.149	***	0.147	***
t-statistic	*14.86*		*14.48*	
News$_t$	0.000		-0.001	
	0.99		*-0.20*	
Order Imbalance$_t$ * News$_t$	-0.042	***	-0.042	***
	-3.55	.	*-3.65*	
Bond size			0.049	***
			2.58	
Equity Size			0.036	*
			1.89	
Firm Sales			-0.026	**
			-2.05	
Leverage			0.004	
			0.62	
ROA			0.001	
			0.50	
Bond Fixed Effect	Yes		Yes	
Month fixed effect	Yes		Yes	
R2 (%)	1.58		1.57	
N	1434389		1329888	

Panel B: Sub-Samples

	Credit Event		Non Credit Event		Good News		Bad News		Invest. Grade		High Yield	
Order Imbalance$_t$	0.142	***	0.146	***	0.138	***	0.139	***	0.139	***	0.176	***
t-statistic	*12.12*		*16.07*		10.44		11.23		16.35		10.39	
News$_t$	-0.002		-0.002		0.018	**	-0.023	**	-0.01	***	0.012	
	-0.24		*-0.69*		2.51		-2.16		-2.87		1.02	
Order Imbalance$_t$ ×News$_t$	-0.047	***	-0.042	**	-0.018	**	-0.037	**	-0.023	***	-0.100	***
	-4.70		*-2.30*		-2.18		-2.12		-3.5		-3.23	
Bond size	0.048	***	0.048	***	0.049	***	0.049		0.039	**	0.046	
	2.57		*2.57*		*2.61*		*2.61*		*2.11*		*1.64*	
Equity Size	0.036	*	0.036	*	0.035	*	0.035		0.039	**	0.021	
	1.89		*1.88*		*1.89*		*1.88*		*1.97*		*0.7*	
Firm Sales	-0.026	**	-0.025	**	-0.026	**	-0.025		-0.003		-0.037	
	-2.05		*-2.04*		*-2.07*		*-1.99*		*-0.21*		*-1.61*	
Leverage	0.004		0.004		0.004		0.005		-0.001		0.005	
	0.62		*0.63*		*0.63*		*0.65*		*-0.09*		*0.45*	
ROA	0.001		0.001		0.001		0.001		0.002		0.005	
	0.5		*0.5*		*0.51*		*0.47*		*1.19*		*1.27*	
Bond Fixed Effect	Yes		Yes		Yes		Yes		Yes		Yes	
Month fixed effect	Yes		Yes		Yes		Yes		Yes		Yes	
R2 (%)	1.56		1.56		1.55		1.55		1.61		1.74	
N	1329888		1329888		1329888		1329888		931338		396077	

Table VII: Relative Information Content of Large and Small Trades: News Days versus Non News Days

This table presents the results predictive regression of cumulative abnormal bond return from day t+2 to t+10 by order imbalance on day t, where order imbalance is estimated as $signed\sqrt{Dollar\,Volume}$. In Column (1) - (3), the Dollar Volume is computed based on trades that are larger than $500,000. In Column (4)-(6), the Dollar Volume is computed based on trades that are smaller than $500,000. Column (1), (2), (4) and(5) include all trades including news and no news day trades, while Column (3) and (6) only include sample where a news event occurs on day t. Month and bond fixed effects are included. The standard errors are clustered on the firm level. All independent variables except for the event dummy are standardized to 0 mean and unit variance. *** 1% significance, ** 5% significance, * 10% significance.

	Big Trades					Small Trades				
	(1)		(2)		(3) Sample where News(t)=1	(4)		(5)		(6), Sample where News(t)=1
Order Imbalance$_t$ ×News$_t$	-0.024	*	-0.019	***		0.029	***	0.022	***	
	-1.86		*-2.88*			*3.23*		*2..85*		
Order Imbalance$_t$	0.010	**	0.014	***	-0.001	-0.086	***	-0.026	***	-0.007
	2.13		*3.26*		*-0.07*	*-10.00*		*-4.55*		*-0.81*
News$_t$	0.022	**	0.022	**		0.009		0.010		
	2.02		*2.04*			*1.29*		*1.38*		
Abnormal Bond Ret$_t$			-0.063		-0.074	***		-1.345	***	-0.121	***
			8.62		*-2.94*			*-29.66*		*-13.37*
Abnormal Turnover$_t$			0.014		0.013			-0.006	*	0.004	
			1.00		*0.81*			*-1.72*		*0.43*
Bond size			-0.046		-0.295			-0.138		-0.421	**
			-0.59		*-0.83*			*-1.06*		*-2.22*
Equity Size			-0.400	***	-0.659	***		-0.247	**	-0.396	***
			-3.17		*-5.16*			*-2.43*		*-2.60*
Firm Sales			0.140	*	0.169			-0.005		-0.051	
			1.74		*0.92*			*-0.07*		*-0.42*
Leverage			0.024		-0.015			-0.015		-0.089	
			0.65		*-0.21*			*-0.56*		*-1.46*
ROA			0.009		0.048			0.014		0.030	
			0.57		*1.28*			*1.35*		*1.24*
Bond Fixed Effect	Yes		Yes		Yes	Yes		Yes		Yes	
Month fixed effect	Yes		Yes		Yes	Yes		Yes		Yes	
R2 (%)	3.86		4.57		7.97	1.88		3.74		5.03	
N	432007		417158		93005	1222958		1078278		260509	

Table VIII: The Number of News Stories and Yield Spreads

This table examines the relationship between the number of news stories and yield spreads in per cent of corporate bond for public firms. For each quarter, we calculate the average number of news stories per day about for each firm, and assign firms into one of the three groups: Group One includes firms that report no news during the quarter; Group Two includes firms whose news counts are below the median for all sample firms during the quarter; and Group Three includes firms whose news counts are above the median. No News is an indicator variable equal to one if a firm belongs to Group One and zero otherwise; Low News is an indicator variable equal to one if a firm belongs to Group Two and zero otherwise. We conduct regressions of corporate bond yield spreads during quarter *t* on No News and Low News dummies during the same quarter, along with several bond and firm characteristics. Bond level characteristics include bond ratings, log(bond issuing amount), time to maturity, coupon rate, and age. Firm level characteristics include return on assets, standard deviation of daily stock return during the quarter, Long term debt to asset ratio, pre-tax interest coverage, total debt to capital ratio, bid-ask spread of stock prices, and log(sales). We also include time and firm fixed effect. The standard errors are clustered on the bond level. Column 1, 2, 4 and 5 include all sample bonds. Column 3 and 6 include only the newest issued bonds of each firm.

	All Bonds		All Bonds		Newest Issued Bonds Per Firm		All Bonds		All Bonds		Newest Issued Bonds per Firm	
No News	1.28	***	0.66	***	1.60	***	2.72	***	1.40	***	3.11	***
	3.86		2.59		2.74		8.33		5.36		5.26	
Low News	0.93	***	0.08	*	0.56	***	0.55	***	0.12	***	0.38	***
	11.50		1.70		4.60		8.90		2.60		4.13	
Ratings							0.31	***	0.38	***	0.34	***
							9.49		6.44		5.62	
Log(Bond_Amount)							-0.23	***	-0.19	***	-1.47	***
							-7.46		-3.83		-11.99	
Maturity							-0.10	***	-0.02		-0.35	***
							-3.42		-1.22		-5.25	
Coupon							-0.26	***	-0.75	***	-0.07	
							-3.73		-10.21		-0.61	
Age							0.16	***	0.33	***	0.00	
							4.46		10.20		0.06	
Return On Equity							-0.42	***	-0.17	***	-0.35	***
							-8.54		-8.11		-5.42	

Ret Std				1.29	***		0.78	***		1.52	***	
				19.52			11.70			13.52		
Long Term Debt/ Total Assets				0.48	***		0.30	***		0.42	***	
				11.85			2.80			6.82		
OI/Sales				-0.08	***		-0.11	***		-0.01		
				-2.76			-2.99			-0.58		
Pre-Tax Interest Coverage				-0.14	***		-0.02			-0.15	**	
				-2.80			-0.46			-2.11		
Total Debt To Capital				0.18	***		-0.05			0.10		
				4.66			-0.37			1.27		
BAspread				0.40	***		0.25	***		0.28	***	
				4.13			4.16			2.94		
Log(Sales)				0.08	*		-0.84	***		0.38	***	
				1.75			-5.66			4.86		
Time Fixed Effect	Yes	Yes	Yes	Yes			Yes			Yes		
Firm Fixed Effect	No	Yes	No	No			Yes			No		
Obs	55573	55573	15279	53084			53084			14274		