From implicit to explicit: The consequences of fee disclosure*

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Abstract

We investigate whether, and to what extent, the cost to investors of processing fee information contributes to the size of corporate bond trading fees. We explore changes in fees around FINRA's 2018 amendment of the customer confirmation rule, requiring corporate bond-market professionals to explicitly disclose the fee (markup) on some retail trades. Investors could have inferred the fee before the rule change using historical transaction prices. Nonetheless, we find that fees associated with trades subject to explicit fee disclosure decline after the rule change, relative to trades that are not subject to explicit fee disclosure. Our findings are pronounced in bonds for which fees were highest before the rule change. In sum, our evidence shows that information processing costs have real effects on corporate bond-market professionals' ability to charge high fees for their services.

Keywords: Dealer markets; Processing costs; Disclosure regulation; Investment advisers

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1. Introduction

Retail investors incur substantial fees to trade bonds (Egan, 2019; Bessembinder et al., 2018). For example, retail corporate-bond investors in our sample pay $900 to execute a $100,000 trade, which is 75 times more than retail equity investors pay and up to 2.7 times more than institutional corporate-bond investors pay.[1] We investigate whether, and to what extent, the cost to investors of processing fee information contributes to the size of bond trading fees. We specifically examine whether the cost of recognizing, acquiring, and analyzing fee information contributes to retail investors' high fees.[2]

To answer this question, we make use of the fact that FINRA (the Financial Industry Regulatory Authority, which regulates US securities market professionals) amended its customer confirmation rule (Rule 2232) in May 2018. Before May 2018, corporate bond trading fees were embedded in the transaction price and not explicitly disclosed. For example, if a dealer purchases a bond for $100 and an investment adviser offers it to his client for $102, earning a markup of $2, the customer confirmation simply shows that the cost of the transaction is $102. After May 2018, professionals transacting in corporate bonds are required to explicitly disclose the markup or markdown from the bond's prevailing market price on the customer trade confirmation. Importantly, this fee disclosure only applies to retail transactions and only if the dealer executes an offsetting trade on the same day.

Investors could have inferred the fee before executing the trade using historical price information from TRACE (the Transaction Reporting and Compliance Engine). Specifically,

[1] An average retail equity investor pays approximately $12 in round-trip transaction fees (commissions) per $100,000 traded (Blackrock, 2018), or 1.2 basis points.

[2] Following Blankespoor et al. (2019a), processing costs include (i) awareness costs (the cost of learning that the information exists); (ii) acquisition costs (the cost of obtaining and extracting the information); and (iii) integration costs (the cost of analyzing the information).

the investor can go to the FINRA Market Data Center to see that someone recently bought the bond for $100.[3] If the adviser is offering the bond for $102, the investor can infer that the markup on the trade is $2. Prior literature shows that access to this historical price information helps investors negotiate better prices (Bessembinder et al., 2006; Edwards et al., 2007; Goldstein et al., 2007).

However, accessing TRACE and using historical price information to calculate fees imposes processing costs on investors (e.g., Blankespoor et al. (2019b)). Consequently, retail bond investors may not understand the size of the fees they incur to trade. Indeed, some retail investors believe they do not incur any fees in the bond market.[4] As former SEC (Securities and Exchange Commission) Commissioner Michael Piwowar explained, "customers who pay hidden markups and markdowns, instead of explicitly disclosed commissions, may mistakenly conclude that they are not incurring any trading costs" (Piwowar, 2018).

If processing costs impede investors' ability to understand the size of the fees they incur to trade, fee disclosure should cause bond-market professionals to lower fees to avoid losing clients. However, the fee disclosure could fail to reduce fees for at least two reasons. First, if investors understand that they are charged high fees to trade bonds and are willing to pay these fees as compensation for intermediation and investment advice (e.g., Choi et al. (2010)), explicitly disclosing the fees should not impact fees. Second, the disclosure could be ineffective in reducing processing costs because the fee is not disclosed until after the trade is executed (on the trade confirmation). According to a financial literacy study conducted by the SEC in 2012, retail investors consider information about fees to be essential, but they

[3]See: http://finra-markets.morningstar.com/MarketData/Default.jsp.
[4]See: http://www.sagharboradvisors.com/bond-proposal.pdf

prefer to receive disclosures before making a decision (SEC, 2012).

Our results support the idea that processing costs contribute to high retail fees. We compare changes in fees associated with retail (small) same-day trades, which are subject to explicit fee disclosure, to retail non-same-day trades and institutional (large) same-day trades, for which fees are not explicitly disclosed. We find that relative to retail non-same-day trades, markups on retail same-day trades decline 3.9 basis points in the six months following the rule change. Relative to institutional same-day trades, bond markups on same-day retail trades decline 5.7 basis points. Relative to retail non-same-day-trades *and* institutional trades, markups on retail same-day trades decline 4.3 basis points. These declines map into an approximately 5 to 6 percent decrease in fees relative to pre-period averages. This evidence supports the idea that lowering the cost of processing fee information is consequential for retail corporate-bond investors.

We next explore cross-sectional variation in the fee reduction. Bond investors are more likely to express dissatisfaction or switch brokers when they discover they are paying higher fees rather than lower fees. Therefore, we expect that bond-market professionals are more likely to reduce fees on high-fee bonds than low-fee bonds. Typically, high-yield, long duration, and small bond issues are characterized by high fees. Consistent with expectations, we find that the aforementioned reduction in same-day retail fees is pronounced for high-yield, long-duration, and small bonds.

We attribute these results to bond-market professionals charging less when their fee is explicitly disclosed. However, a potential alternative explanation for our results is that professionals avoid disclosing the fee when the fee is high. Although expressly prohibited by FINRA, the professional can avoid triggering the disclosure rule by not executing an

offsetting trade on the same day. If this shifting behavior happens, the fee reduction we observe could be driven by a change in the mix of trades that take place on the same day as an offsetting trade, rather than by a reduction in fees. In contrast with this alternative explanation, we find no change in the prevalence of same-day trades.

Another threat to the attribution of our results to fee disclosure is a potential violation of the parallel trends assumption. Specifically, our research design assumes that in the absence of explicit fee disclosure, the average change in fees would have been the same for both treatment and control trades. We address the parallel trend assumption in two ways. First, we add group-specific time trends that allow each trade size category (small and large) to have different trends in fees. Second, we run a placebo test, in which we shift the time frame of our analysis back one year and create a pseudo-disclosure rule, effective exactly one year before FINRA began requiring bond-market professionals to disclose fees explicitly. The results of both of these tests support the attribution of our results to fee disclosure rather than a time trend.

Our setting and findings are relevant to the SEC, which often seeks to protect retail investors by lowering the cost of processing information. Academics find mixed evidence about the efficacy of lowering the cost of processing fundamental information. For example, Drake et al. (2015) show that lowering the cost of acquiring fundamental information (via EDGAR) increased equity investors' responsiveness to earnings. Several studies show that equity investors are more responsive to information recognized on the face of the financial statements than to similar information disclosed in the footnotes (Barth et al., 2003; Ahmed et al., 2006; Michels, 2017). By contrast, Blankespoor et al. (2019b) show that lowering the cost of processing earnings news (via automated news alerts) does not change equity

investors' sensitivity to earnings. Relative to using fundamental accounting information, inferring transaction fees using TRACE imposes minimal processing costs on bond investors. Nonetheless, our results show that reducing the cost of estimating transaction fees helps to protect retail corporate-bond investors from paying high fees.

Relatedly, our paper contributes to a recent and growing literature documenting that financial professionals take advantage of unsophisticated investors and consumers (Gennaioli et al., 2015; Garleanu and Pedersen, 2018; Egan, 2019; Law and Mills, 2019). Because FINRA generally does not revoke the licenses of professionals that are charged with professional misconduct or other criminal acts, alternative tools are necessary to constrain their bad behavior (Law and Mills, 2019; Egan et al., 2019; Kowaleski et al., 2020; Honigsberg, 2019). Our paper lends support to the idea that fee transparency is a tool that can constrain financial professionals' ability to take advantage of less sophisticated investors (Campbell et al., 2011; Agarwal et al., 2009, 2015).

Our findings also speak to specific regulatory efforts to protect investors in the corporate bond market. Focusing on the introduction of TRACE, Bessembinder et al. (2006) and Edwards et al. (2007) show that access to executed trade prices via TRACE helped to lower transaction costs, particularly for small, unsophisticated investors that did not have other means to estimate bond prices. Our paper shows that *access* to information (through TRACE) is not enough to protect retail investors from paying high fees because the information is costly to process.[5]

[5]The fee disclosure we study differs from the introduction of TRACE in two respects. First, the introduction of TRACE provided otherwise unavailable information, enabling investors to calculate their transaction fees for the first time. By contrast, Amended Rule 2232 provides an explicit disclosure of fees, which serves to reduce the cost of processing available fee information. Second, whereas TRACE provides historical price information that enables investors to assess their fees before the transaction, the Amended Rule 2232 does not require fee disclosure until after the trade is executed.

The paper proceeds as follows. In Section 2, we provide institutional detail about trading in the corporate bond market. Section 3 describes the data and variables we use in the study. Section 4 explains the research design and provides results. Section 5 concludes.

2. Institutional Setting

The US corporate bond market is economically important, with approximately $9 trillion of outstanding principal and $30 million in daily trade volume (roughly 30 percent of the US equity market).[6] Despite its size and importance, the corporate bond market is less transparent than equity markets.

Bonds trade over-the-counter through dealer networks. Small investors who choose to invest in the bond market directly typically do so through financial advisers at large broker-dealers. Broker-dealers market bonds to their clients and charge a "markup" (or "markdown") over (under) the prevailing market price of the bond on each trade. This markup consists of two components: The dealer's component and the investment advisers' component.

The dealer's component compensates the dealer for making a market in the bonds. Similar to equity markets, this component of markups and markdowns serves to compensate dealers for the costs of intermediation: (1) order processing (Roll, 1984), (2) inventory risk (Ho and Stoll, 1981), and (3) the cost of adverse selection incurred when transacting with better informed traders (Glosten and Milgrom, 1985). The adviser's component, known as "sales credit," compensates financial advisers for selling the securities and providing financial

[6] https://www.sifma.org/resources/research/bond-chart/

advice.[7]

Dealers and investment advisers (collectively, bond-market professionals) have an information advantage over investors in opaque, illiquid, decentralized markets like the corporate bond market because they observe order flow and are knowledgeable about the bonds they trade (Green et al., 2007b). Moreover, retail investors lack the sophistication and resources to assess the fairness of price quotes (Duffie et al., 2007). This information advantage contributes to bond-market professionals' ability to charge unsophisticated (retail) investors a premium to purchase and sell bonds.

Figure A-1 provides an example of the trade process for a bond that is sold by a retail seller and bought by a retail buyer. Client A contacts his financial adviser (FA1) because he wants to sell a bond. FA1 obtains a bid from a dealer to purchase the bond for $100.50. FA1 goes back to his client and offers to buy the bond for $100.00, earning $0.50. Client A decides whether he is willing to sell for this price and sells the bond for $100.00. The dealer now offers the bond to FA2 for $101.00, earning $0.50. FA2 offers the bond to Client B for $102.50, earning $1.50 over the dealer's price. Client B decides whether his willing to pay this price and buys the bond for $102.50. The dealer, FA1, and FA2 collectively earn $2.50 on these transactions.

For decades, trades were only reported to the parties involved in the trade. They were not made public, making it impossible for bond investors to compare their own execution price to those of other investors. Moreover, pre-trade price quotations (which indicate prices at which dealers are willing to transact) were available only to bond-market professionals by

[7]Conversations with industry professionals indicate that the adviser's component contributes heavily to the premium retail investors pay to purchase (or the discount they incur to sell) bonds. To the authors' knowledge, this is the first academic paper to recognize that markups and markdowns are not only related to the costs of intermediation, but also to the cost of investment advice.

telephone. This lack of pre-trade and post-trade transparency is particularly disadvantageous to unsophisticated retail investors (Edwards et al., 2007).

Pre-trade price transparency remains limited in the corporate bond market. However, post-trade price transparency improved in 2002, when NASD required all secondary market bond transactions to be reported through TRACE. Following the introduction of TRACE, bond traders can use executed trade prices to assess the competitiveness of their own trade prices in the same or similar bonds and negotiate better terms before executing the trade.

Figure A-2 provides a snapshot from TRACE. It illustrates how an investor can see the price at which someone (likely the dealer) recently purchased the bond and use this information to negotiate her own price.[8] Despite this improvement in transparency, industry professionals told us in private conversations that some retail investors are not aware that they pay any fees at all to trade bonds because they are embedded in the price. This lack of awareness is possible because until recently, brokerage firms were *not* required to disclose the markup charged on each trade.

In response to the SEC's concerns that retail fixed income investors are limited in their ability to understand the transaction costs associated with their trades, FINRA amended their customer confirmation rule (Rule 2232) on May 14, 2018. These amendments are the result of a multi-year process during which FINRA solicited feedback twice (in 2014 and

[8]As shown in the red box, on August 25, 2016, at 16:42:05, a customer sells 40,000 in par value for a price of 99.621 ($39,848.40). At 16:57:56 (15 minutes later), a customer buys the same bond and quantity from a dealer for a price of 100.877 ($40,350.80). This difference in price implies a markup of 1.26 percent (about $502.40).

2015). The SEC approved FINRA's amendments on November 17, 2016.[9]

The amended rule requires bond-market professionals to disclose transaction fees (markups and markdowns) on customer confirmation statements whenever a security is bought from (or sold to) a retail customer on the same day as the security is sold (bought) by the dealer. Table A-1 describes the information bond investors receive on their trade confirmations after this regulation and compares it to the information received before the regulation. We also contrast this to the information equity investors receive on their trade confirmations during the entire sample period.

3. Data

3.1. Sample

To examine changes in fees associated with corporate bond trades in the period around the amended Rule 2232, we rely on the TRACE database. The OTC corporate bond transaction data available through TRACE's Bond Trade Dissemination Service (BTDS) database include the following relevant information for each corporate bond trade: CUSIP; date; time; price; yield; quantity; an indication of whether the trade is a purchase or a sale; and an indication of the counterparty type (i.e., customer or dealer). We use the Mergent Fixed Income Securities Database (FISD) to supplement TRACE with a comprehensive set of bond issue

[9]The MSRB concurrently amended rule G-15, requiring markup/markdown disclosures on retail customers' municipal bond trade confirmations when an offsetting principal trade occurs on the same day. We focus on corporate bonds for two reasons. First, municipal bonds trade much less frequently than corporate bonds, limiting the sample for which we can meaningfully compare markups on same-day retail trades to those on non-same-day retail trades. More importantly, the institutional setting is sufficiently different in corporate bonds that a combined study would be inappropriate. As such, we caution readers that the results of this study may not generalize to other market settings.

characteristics (including bond issue size, issue date, bond features, bond ratings, coupon rate, and frequency of payment).

Similar to Bessembinder et al. (2006), who study the effect of the introduction of TRACE on transaction costs in the corporate bond market, we restrict our sample to six months before and six months after the fee disclosure rule change. Specifically, our sample period begins on November 7, 2017, and ends on November 21, 2018, to allow for six months in the pre-treatment and post-treatment periods. To avoid an overlap between the pre- and post-period when calculating markups, we drop the week before and the week after May 14, 2018.[10]

As shown in Panel A of Table 1, the full TRACE sample of trades during our sample period consists of 15,808,404 trades over 40,885 bonds (individual CUSIPs) for 7,889 unique bond issuers. We apply several standard cleaning techniques to correct previously identified errors in the TRACE data. We begin by dropping all trades with missing CUSIP information. Following prior studies (e.g., Schestag et al., 2016), we also eliminate duplicated, corrected, and canceled trades.

Next, we merge our cleaned TRACE sample with the Mergent FISD bond characteristic data. We drop all privately issued and 144A securities, as these are only traded by qualified institutional investors. Next, we remove all adjustable rate, foreign denominated, perpetual, and convertible securities (Bessembinder et al., 2006) and those securities with odd trade denominations (i.e., those that trade in increments other than $1,000). To remove obvious data entry errors and eliminate securities in extreme distress, we restrict our sample to those securities with dollar prices above 50 (i.e., 50% of face value) and below 150 (Green et al.,

[10]Our results are not sensitive to the inclusion of these dropped weeks.

2007a). Finally, as our interest is in secondary market markups, we drop all trades within 90 days of the issuance date and those with less than a year maturity at issuance (Even-Tov, 2017). These steps yield a sample that consists of 10,873,744 trades over 15,833 individual bonds for 2,279 unique bond issuers

Panel B of Table 1 summarizes the bond and transaction characteristics of the sample. The average (median) bond has approximately 7.35 (5.06) years remaining to maturity and is 4.57 (3.59) years from the issuance date. The typical issue size of the bonds is large, with a mean (median) of $1.20 billion ($1.00 billion). Finally, the mean (median) trade size is $247.95 ($25) thousand, implying a significantly right-skewed distribution.

3.2. Variable Construction

Similar to Green et al. (2007a) and Hong and Warga (2000), our primary proxy for fees, *Gross Markup*, is the total round-trip cost that an investor of size group s (small or large) pays to buy and sell bond i on date t. We define trade size s as small if the trade is less than or equal to $100,000 and large otherwise (Edwards et al., 2007). If no offsetting trade occurs on date t, for each customer purchase on date t, we look seven calendar days back for a customer sale of the same size group in the same bond. We formally define gross markup as:

$$Gross\ Markup^{s}_{i,t} = \frac{P^{Ask}_{i,t,s} - P^{Bid}_{i,t-j,s}}{P^{Bid}_{i,t-j,s}}$$

$P^{Ask}_{i,t,s}$ is the par-weighted average customer purchase price of bond i on date t in trade size category s. $P^{Bid}_{i,t-j,s}$ is the par-weighted average customer sale price of bond i on date $t-j$ in trade size category s. Each daily customer purchase, $P^{Ask}_{i,t,s}$, is uniquely matched with the

nearest associated customer sale in prior trade dates (j) up to a maximum of 7-calendar days.

We follow Schestag et al. (2016) and eliminate all entries with an implied markup that is negative or zero and all observations for days outside the bond's life span. Finally, we require at least two valid measures of our *Gross Markup* measure to ensure a consistent sample when including bond-level fixed effects. All continuous variables are Winsorized at the 1st and 99th percentiles to mitigate the impact of outliers. Panel A of Table 2 shows that we can measure gross markup for 1,029,373 bond-day-size groups.

We gain identification from the fact that fee disclosure is only required for retail trades executed on the same day as an offsetting trade in the same bond by the same dealer. Consistent with prior literature, we identify retail trades based on trade size (Edwards et al., 2007). We create an indicator, *Small Trade*, equal to one if the gross markup measure is constructed using trades that are less than or equal to $100,000 in par value. In general, smaller trades account for most transactions in corporate bond markets (approximately 65% of our sample of gross markups), which is consistent with prior studies (e.g., Schestag et al., 2016).

We also create an indicator, *Same Day*, equal to one if our measure of gross markup is calculated using a customer purchase and a customer sale that take place on the same day. Approximately 62% of our gross markups are measured using trades that are executed on the same day as an offsetting trade.

We cannot perfectly identify whether the same dealer executes an offsetting trade on the same day for two reasons. First, we cannot identify the dealer in the trade data. Thus, we cannot be sure that the same dealer executes the same-day trades. Second, some large

trades are broken down into smaller trades, so the quantity bought and sold differs. In this instance, we would not identify these trades as offsetting.

Importantly, any measurement error associated with calculating gross markup, with identifying which trades are retail, or with identifying which trades have a same-day offset exists in both the pre-period and the post-period. This type of error does not bias our results in a particular direction.

3.3. Descriptive statistics

Panel A of Table 2 reports descriptive statistics for the primary variables of our constructed sample. Our sample consists of 1,029,373 gross markup observations over 11,033 unique securities. The mean *Gross Markup* for bonds in our sample is 70.46 basis points. The median is only 39.22, and the standard deviation is 80.75, illustrating the substantial variability and skewness of these markups. We find similar magnitudes using alternative transaction cost variables (we describe these variables, as well as the steps in their calculation in Appendix B). The mean (median) AD-Ratio and BD-Ratio are 45.22 (21.98) and 35.88 (21.21) basis points, respectively.[11]

The maturities and issue sizes among our sample of gross markups are quite similar to these values for the full sample of trades. The average time remaining to maturity is 7.6 years, and the average issue size is $1.02 billion.

Panel B of Table 2 presents Pairwise Pearson and Spearman correlations. The correlation between all three markup measures is high. Markups tend to be lower when trade volume

[11]Note that the number of observations is different across these measures. This disparity is due to the fact that we need a dealer-to-dealer trade to occur to calculate the ask-dealer and bid-dealer ratios, which occurs approximately 70% of the time.

is high and when an offsetting trade takes place on the same day because inventory holding costs are lower.

The correlation between our three markup measures and the small trade variable is strongly positive, which is consistent with prior studies that show small traders pay substantially more in bond markets (e.g., Edwards et al., 2007). Finally, consistent with prior studies (e.g., Bessembinder et al., 2006), markups are higher for high yield (non-investment grade) securities and those with more time remaining to maturity, and lower for large issues.

4. Research Design and Results

4.1. Identification

Our objective is to determine whether explicit fee disclosure on customer trade confirmations affects fees (bond markups). Because the fee disclosure only applies to retail (small) trades and only if an offsetting transaction occurs on the same day, we employ both a difference-in-differences and a difference-in-difference-in-difference research design (also known as a triple-difference or DDD specification). The fee disclosure creates three levels of differences: small versus large trades, same-day versus non-same day trades, and before versus after the explicit fee disclosure amendment. This research design is commonly used to mitigate potential parallel trend violation concerns (Kim, 2018; Butler, 2011; Rauh, 2006; Gruber, 1994).

We begin by limiting the sample to same-day trades and exploring the fact that the rule change applies only to retail trades. We compare changes in markups on same-day retail

(small) trades to changes in markups on same-day institutional (large) trades. This design uses large trades as a control for general trends in same-day markups.

Next, we limit the sample to small trades and explore the fact that the fee disclosure only applies if an offsetting transaction occurs on the same day. We compare changes in markups on small trades that have a same-day offset to small trades that do not have a same-day offset. This design uses non-same-day trades as a control for trends in small trade markups.

Finally, we employ a difference-in-difference-in-difference design. This design allows us to use both large trades and non-same-day trades as controls simultaneously. The DDD design helps to ensure that the effect we document is attributable to fee disclosure, rather than market-wide changes or time trends related to small trade markups. If fee disclosure reduces bond-market professionals' ability to charge high fees, we should observe a stronger effect in small trades executed on the same day as an offsetting trade than in other trades.

4.2. Univariate analysis

Table 3 reports the results of our univariate analysis. Columns (a) through (c) examine changes in small and large trade markups when a buy and sell occur on the same day. Columns (d) through (f) examine changes in small and large trade markups when the buy and sell do not occur on the same day. Columns (a), (b), (d), and (e) illustrate that markups on small trades are significantly greater than on large trades, consistent with prior evidence that dealers charge higher markups to retail investors (Green et al., 2007a; Edwards et al., 2007). Further, markups are lower when the buy and sell occur on the same day than when

the dealer has to hold the bond in inventory for several days.[12]

Column (c) shows that same-day small trade markups decline 9.62 bps, whereas same-day large trade markups decline 2.86 bps. We attribute the decline in large trade markups to a general decline in markups in the post period.

Same-day small trade markups decline 6.76 bps more than same-day large trade markups (Column c). By contrast, Column (f) shows that non-same-day small trade markups decline only 3.20 bps more than non-same-day large trade markups. Thus, same-day small trade markups decline more than non-same-day trade markups.

Notably, non-same-day small trade markups fall by 3.20 bps relative to non-same-day large trade markups. Because our design uses non-same-day trade markups as a control, we treat this change as unrelated to fee disclosure. However, the decline may be attributable to a spillover effect of fee disclosure if some investment advisers lower the fees on all retail trades, regardless of whether a same-day offsetting trade occurs. If such a spillover effect exists, we are underestimating the effect of fee disclosure by limiting our inferences to same-day trade markups.

Column (g) shows that same-day small trade markups converge toward large trade markups 3.55 bps more than non-same-day small trade markups. This difference is economically meaningful, representing a 4.1 percent reduction in markups, relative to the cost of a small trade in the pre-disclosure period.[13] This reduction is similar to the 5 bp decline in markups that Edwards et al. (2007) document after the introduction of transaction reporting

[12]Consistent with standard difference-in-differences approaches (i.e., Angrist and Pischke, 2009), our identifying assumption is that in the absence of treatment, the difference in levels (and not the percentage changes) would remain the same across groups.

[13]Calculated using the average pre-disclosure period markup for same-day, small trades of 86.13 basis points. These averages are shown in Table 3.

through TRACE. Our findings provide preliminary evidence that the requirement to disclose fees on same-day retail trades contributes to reduced fees.

4.3. Multivariable analysis

In this subsection, we examine the relation between fee disclosure and fees (markups) charged to small retail investors in a regression framework that controls for variables that are related to transaction fees. First, we limit the sample to same-day trades and examine changes in fees (markups) charged to retail (small) bond investors relative to institutional (large) bond investors. We estimate the following regression:

$$\begin{aligned} GrossMarkup^{s}_{i,t} = \beta_0 + \beta_1 Post_{i,t} + \beta_2 Small\ Trade_{i,t} + \beta_3 Post \times Small\ Trade_{i,t} \\ + \alpha_{1i} + \alpha_{2t} + \sum \gamma Controls_{i,t} + \varepsilon_{i,t} \end{aligned} \quad (1)$$

Columns (1) and (2) of Table 4 present results. The coefficient on *Post* (-3.79) in Column (1) shows that markups generally decline in the six months after the fee disclosure requirement. The coefficient on *Small Trade* (45.25) confirms that markups on small trades are larger than markups on large trades, by about 45 bps. The variable of interest in this column is $Post \times Small\ Trade$. The coefficient of -5.55 corroborates the univariate evidence described above and shows that small same-day trade markups decline 5.55 bps more than large same-day trade markups in the post-disclosure period.

The coefficients on the control variables are generally consistent with prior literature. Markups increase with time remaining to maturity, years since issuance, and dealer activity. Markups decrease with trade volume. Results in Column (2), when we add bond and time fixed effects, remain largely the same.

Next, we limit the sample to small trades and examine changes in fees (markups) on small trades executed on the same day as an offsetting trade relative to small trades without a same-day offset. We estimate the following regression:

$$\begin{aligned} GrossMarkup^{s}_{i,t} = \beta_0 + \beta_1 Post_{i,t} + \beta_2 Same\ Day_{i,t} + \beta_3 Post \times Same\ Day_{i,t} \\ + \alpha_{1i} + \alpha_{2t} + \sum \gamma Controls_{i,t} + \varepsilon_{i,t} \end{aligned} \tag{2}$$

The coefficient on *Post* in Column (3) of Table 4 (-6.30) shows again that small trade markups decline in the six months after the fee disclosure requirement. The coefficient on *Same Day* (-15.29) confirms that markups are smaller when the dealer does not need to hold the bond in inventory by about 15 bps. The variable of interest in this column is $Post \times Same\ Day$. The coefficient of -2.35 indicates that same-day small trade markups decline 2.35 bps more than non-same-day small trade markups in the post-disclosure period. Results in Column (4), when we add bond and time fixed effects, remain largely the same.

Finally, we use the entire sample of gross markups in a DDD framework to confirm the evidence described above by estimating the following regression:

$$\begin{aligned} GrossMarkup^{s}_{i,t} = \beta_0 + \beta_1 Post_{i,t} + \beta_2 Small\ Trade_{i,t} + \beta_3 Same\ Day_{i,t} \\ + \beta_4 Small\ Trade \times Same\ Day_{i,t} + \beta_5 Post \times Small\ Trade_{i,t} \\ + \beta_6 Post \times Same\ Day_{i,t} + \beta_7 Post \times Small\ Trade \times Same\ Day_{i,t} \\ + \alpha_{1i} + \alpha_{2t} + \sum \gamma Controls_{i,t} + \varepsilon_{i,t} \end{aligned} \tag{3}$$

Columns (5) and (6) of Table 4 present our primary results. Markups are larger on small trades and smaller on same-day trades. Markups generally decline in the post-disclosure period. Markups decline incrementally more for small trades than large trades (the coefficient on $Post \times Small\ Trade$ is negative and generally significant), particularly when those trades

occur on the same day as an offsetting trade (the coefficient on $Post \times Small\ Trade \times Same\ Day$ is negative and significant). In terms of economic magnitude, the coefficients on $Post \times Small\ Trade \times Same\ Day$ (-2.12 in Column (5) and -4.27 in Column (6)) show that small trade markups executed on the same day as an offsetting trade decline 2.5 to 5.0 percent, relative to other trades. We attribute this reduction to explicit fee disclosure.

4.4. Cross-sectional analysis

Next, we explore cross-sectional variation in the relationship between the rule change and markups to help ensure our results are attributable to fee disclosure. We expect explicit fee disclosure to have a greater effect on the transaction fees associated with high-fee bonds. Bond investors are more likely to complain or switch brokers when they discover they are paying high fees than if they discover they are paying low fees. To test this cross-sectional prediction, we employ three different proxies for high fees.

First, we follow Bessembinder et al. (2006) and consider the bond's credit rating. High yield bonds (those rated below BBB- by both Moody's and Standard & Poor's, HY) trade less often and have higher markups than investment-grade bonds. In our sample, pre-period small-trade markups on HY (IG) bonds are 115 bps (87) bps.

Second, we consider the maturity of the bond. Bonds with a longer maturity tend to have higher markups because fees can be spread over a longer period and have a smaller effect on the yield. Because of this, many brokerage firms have internal policies that allow advisers to charge higher fees to retail clients for longer duration bonds. The average pre-period small-trade markup on long-duration bonds (i.e., greater than ten years) is 180.02

bps, whereas the markup on shorter-duration bonds (i.e., less than ten years to maturity) is 74.36 bps.

Third, we consider issue size. Small bonds ($LoSize$) trade less frequently than large bonds ($HiSize$), making it harder for investors to gather information from past transaction prices. This difficulty results in higher markups on $LoSize$ bonds. We follow Bessembinder et al. (2006) and classify $HiSize$ bond issues as those above \$500 million. The average pre-period small-trade markup on $LoSize$ ($HiSize$) bond issues is 136.88 (70.77) bps.

Table 5 provides results in which we interact each of these three cross-sectional variables (Var) with all of the variables in equation 3. For brevity, we only report the coefficients and test-statistics for our main variables of interest. Confirming that small-trade markups tend to be higher on the bond types we identified, $Small\ Trade$ is significantly positive in all specifications.[14]

In Columns (1) and (2), Var is equal to one if the bond is HY, and zero otherwise. Consistent with expectations, the decline in markups in the post-disclosure period is greater for HY bonds than IG bonds. In terms of economic magnitude, the coefficients on $Post \times Small\ Trade \times Same\ Day \times\ Var$ (-5.71 in Column (1) and -2.81 in Column (2)) show that small trade markups for HY bonds executed on the same day as an offsetting trade decline 5.71 to 2.81 bps more than IG bonds. This decline represents a 5.0 to 2.4 percent incremental reduction relative to the pre-period markup on HY bonds.

In Columns (3) and (4), Var is a continuous variable equal to the time remaining to maturity of the bond. The effects of the fee disclosure increase with the time remaining

[14]A number of papers use similar specifications that employ quadruple interactions (e.g., Dambra et al., 2018; Phillips and Sertsios, 2017; Montone and Zwinkels, 2019; Grosfeld et al., 2020).

to maturity. Specifically, the coefficients on $Post \times Small\ Trade \times Same\ Day \times Var$ in Columns (3) and (4) are significantly negative (-0.36 in Column (3) and -0.44 in Column (4)). Economically, these coefficients show that for a 10-year bond, markups decline 3.6 to 4.4 bps more than for a bond that is currently approaching maturity. This decline represents a 2.0 to 2.4 percent incremental reduction relative to the pre-period markup on these longer-duration bonds.

In Columns (5) and (6), Var is equal to $LoSize$. Consistent with expectations, we find stronger effects of the fee disclosure for smaller bonds. Specifically, the coefficients on $Post \times Small\ Trade \times Same\ Day \times Var$ are negative in columns (5) and (6), though they are only significant in column (6). Economically, markups on $LoSize$ bonds decline 4.81 bps more than those of $HiSize$ bonds. This is a 3.5 percent incremental reduction relative to the pre-period markup on $LoSize$ bonds.

4.5. Alternative explanations

Bond-market professionals can avoid triggering the markup disclosure rule by not executing an offsetting transaction on the same day. FINRA noted during the Rule 2232 rulemaking process that any intentional delay of a customer execution to avoid triggering the markup disclosure requirements may violate Rule 2232, Rule 5310 (Best Execution and Interpositioning), and Rule 2010 (Standards of Commercial Honor and Principles of Trade). Nonetheless, if professionals successfully avoid disclosing markups, it is possible that our results are not driven by fees going down, but by moving high-fee trades to non-same day trades.

To ensure that our results are not due to shifting same-day high-fee trades to non-same day trades, we examine whether the proportion and volume of same-day trades changes after the markup disclosure rule. We re-estimate equation 3 using different dependent variables. Table 6 presents the results of these tests. For brevity, we only report the coefficients and test-statistics for our main variables of interest.

In Columns (1) and (2), the dependent variable is an indicator equal to one if the markup is calculated using same-day offsetting trades and zero otherwise. We find that the coefficient on $Post \times Small\ Trade$ is insignificantly different from zero. In Columns (3) and (4), in which the dependent variable is the total par volume of trades, we find that the coefficient on $Post \times Small\ Trade \times Same\ Day$ is positive and significant. The positive coefficient indicates that the total volume of same-day small trades goes *up*, not down, relative to large trades and non-same day small trades. Thus, the liquidity of same-day small trades improves rather than declines. The results in Columns (1) through (4) provide evidence that dealers do not shift same-day trades to avoid the fee disclosure.

4.6. Parallel trends and robustness

4.6.1. Parallel trends

A key underlying assumption required for our difference-in-differences research design and the internal validity of our natural experiment is the existence of parallel trends. This assumption requires that fees charged on treatment trades (small, same-day) follow a similar pattern in the pre-disclosure period as control trades (large and non-same-day). If a differential trend exists between our treatment and control groups in the pre-disclosure period,

we would be unable to separate the effect of fee disclosure from the effect of the pre-existing diverging trends.

To address the parallel trend assumption and to ensure that our results are not driven by other macro factors, we perform several tests. First, we follow Serfling (2016) and add linear time trends specific to each size category to equation 3. These group-specific time trends control for the possibility that transaction costs on small trades and those on large trades trend differently throughout the sample period. As shown in Columns (1) and (2) of Table 7, our results hold after controlling for these trends.

Second, we follow prior studies and perform our test in a placebo period (Gilje and Taillard, 2016; Derrien, 2013; Amorea and Bennedsen, 2013; Almeida et al., 2017). Specifically, we move the window of our analysis back exactly one year before FINRA began requiring bond-market professionals to disclose fees explicitly and re-estimate equation 3 over a placebo sample period spanning November 7, 2016, to November 21, 2017. The *Post* variable is equal to one after May 14, 2017.

Columns (3) and (4) of Table 7 present the results of the placebo test. For brevity, we only report the coefficients and test-statistics for our main variables of interest. The coefficient on $Post \times Small\ Trade$ is significantly negative, providing evidence of a trend toward lower markups on small trades. However, we do not find a statistically or economically meaningful difference in the fee reduction for same-day retail trades relative to other trades (the coefficient on $Post \times Small\ Trade \times Same\ Day$ is insignificantly positive in Column (3) and insignificantly negative in Column (4)). This placebo test supports our conclusion that the reduction in fees we document in Table 4 is not attributable to a pre-existing trend.

4.6.2. Robustness

To ensure that our results are not sensitive to our measure of markup, we examine alternative measures of markup. Columns (5) through (8) of Table 7 separately examine markups on bond purchases (*AD-Ratio*) and markdowns on bond sales (*BD-Ratio*). We find evidence of a reduction in fees using both measures. In particular, Column (6) shows that same-day small trade markups on bond purchases decline 2.30 bps more than non-same-day small trade markups. Column (8) shows that same-day small trade markdowns on bond sales decline 0.83 bps more than non-same-day small trade markdowns. The reduction is likely more dramatic for bond purchases because markups on bond purchases tend to be larger than markups on bond sales.

5. Conclusion

Significant debate went into FINRA's decision to require bond-market professionals to disclose markups on retail trade confirmations. The proponents (e.g., the Consumer Federation of America) argued that the long-overdue rule change "would result in retail investors receiving more and better disclosure that would allow them to make better informed investment decisions, and it would foster increased price competition in fixed income markets." The opponents (e.g., FIF and SIFMA) argued that the costs of implementation (including the cost of questions from investors and regulators about fees) would be significant.

Assuming the costs of implementation are passed along to customers, the change in fees that we observe is the net effect of the rule change. We find that the rule was effective in reducing bond-market professionals' ability to charge retail investors high fees. Markups on

trades subject to fee disclosure (small trades with a same-day offset) decline approximately 5 percent versus pre-treatment averages relative to trades not subject to fee disclosure (large trades and small trades without a same-day offset). This evidence supports the idea that fee-related processing costs contribute to corporate bond investors' trading fees.

Appendix A. Illustrative examples

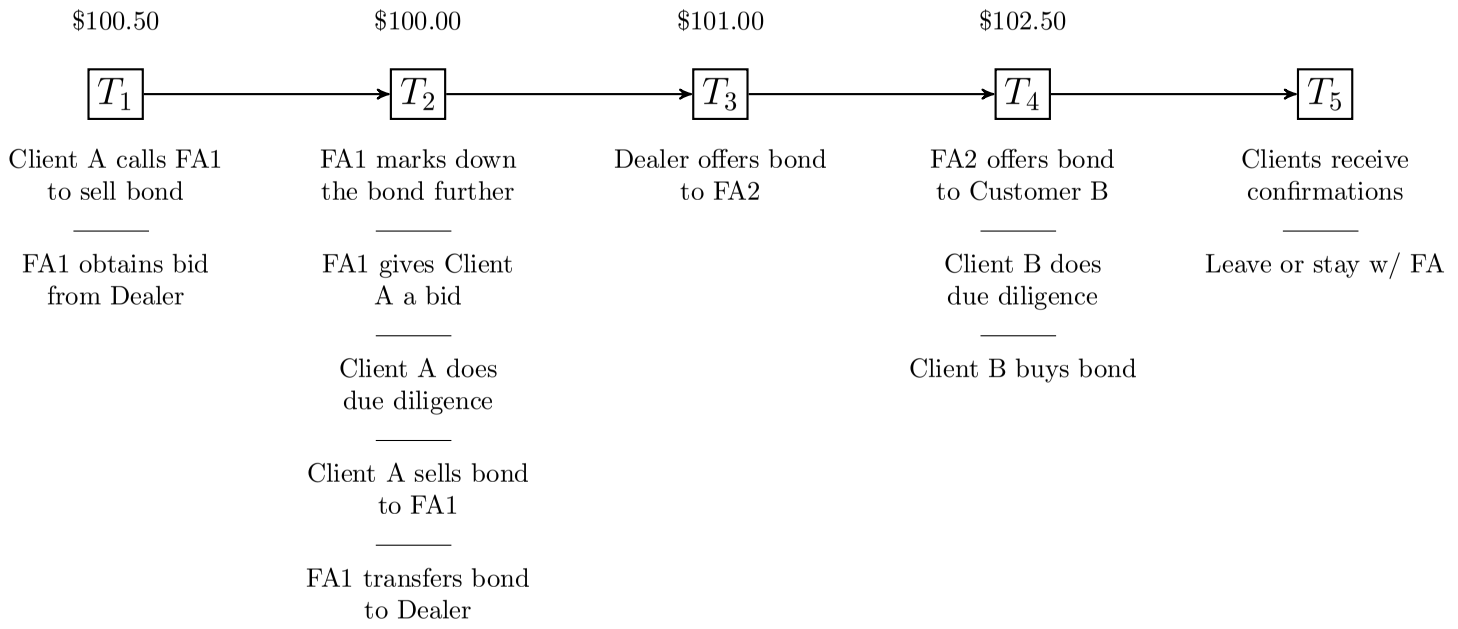
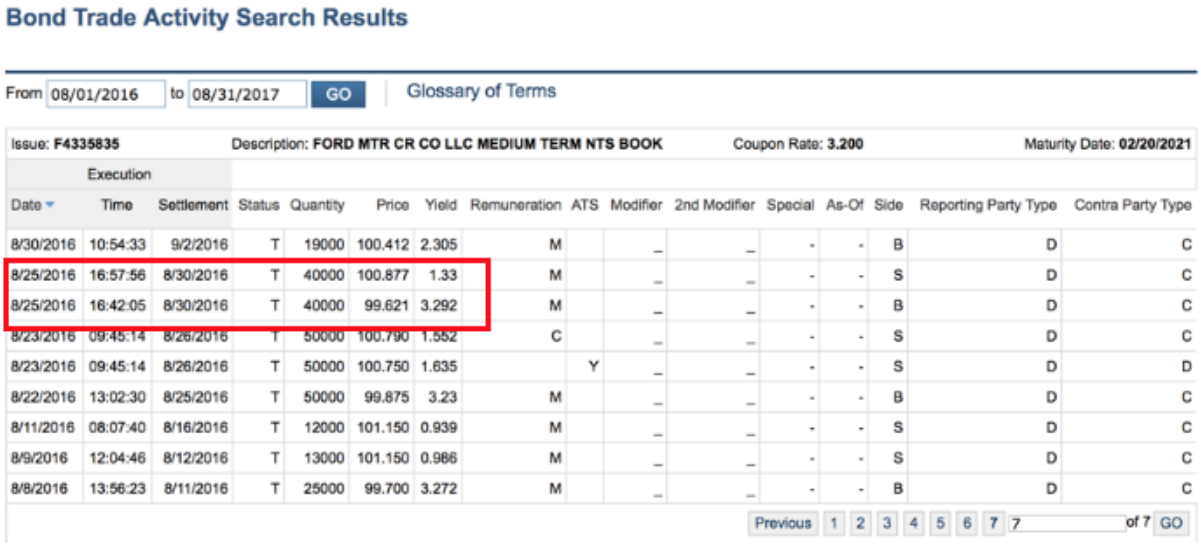


Fig. A-1 Timeline of trade

This figure provides a timeline of the trade process for a bond that is sold by a retail client at T_2 and bought by a retail client at T_4. Client A contacts his financial adviser (FA1) because he wants to sell a bond. FA1 obtains a bid from a dealer to purchase the bond for $100.50. FA1 goes back to his client and offers to buy the bond for $100.00, earning $0.50. Client A decides whether he is willing to sell for this price and sells the bond to FA1 for $100.00. The dealer now offers the bond to FA2 for $101.00, earning $0.50. FA2 offers the bond to Client B for $102.50, earning $1.50 over the dealer's price. Client B decides whether his willing to pay this price and buys the bond for $102.50. The dealer, FA1, and FA2 collectively earn $2.50 on these transactions. The gross markup on this sample trade is 250 basis points ([102.50-100.00]/100.00).



Bond Trade Activity Search Results

From 08/01/2016 to 08/31/2017 GO | Glossary of Terms

Issue: **F4335835** Description: **FORD MTR CR CO LLC MEDIUM TERM NTS BOOK** Coupon Rate: **3.200** Maturity Date: **02/20/2021**

	Execution													
Date	Time	Settlement	Status	Quantity	Price	Yield	Remuneration	ATS	Modifier	2nd Modifier	Special	As-Of	Side	Reporting Party Type	Contra Party Type
8/30/2016	10:54:33	9/2/2016	T	19000	100.412	2.305	M		_	_	-	-	B	D	C
8/25/2016	16:57:56	8/30/2016	T	40000	100.877	1.33	M		_	_	-	-	S	D	C
8/25/2016	16:42:05	8/30/2016	T	40000	99.621	3.292	M		_	_	-	-	B	D	C
8/23/2016	09:45:14	8/26/2016	T	50000	100.790	1.552	C		_	_	-	-	S	D	C
8/23/2016	09:45:14	8/26/2016	T	50000	100.750	1.635		Y	_	_	-	-	S	D	D
8/22/2016	13:02:30	8/25/2016	T	50000	99.875	3.23	M		_	_	-	-	B	D	C
8/11/2016	08:07:40	8/16/2016	T	12000	101.150	0.939	M		_	_	-	-	S	D	C
8/9/2016	12:04:46	8/12/2016	T	13000	101.150	0.986	M		_	_	-	-	S	D	C
8/8/2016	13:56:23	8/11/2016	T	25000	99.700	3.272	M		_	_	-	-	B	D	C

Previous 1 2 3 4 5 6 7 7 of 7 GO

Fig. A-2 Assessing markups using TRACE

This figure presents the methodology that retail investors could have used to assess markups before FINRA amended Rule 2232 using the FINRA Market Data Center. As highlighted in red, the dealer bought 40,000 (in par volume) worth of bonds at $99.621 from one customer and sold to another customer at $100.877 in the same hour. Using our methodology, we would record this trade as a retail, same-day trade with a gross markup of 126.07 basis points.

Table A-1
Comparison of Customer Confirmations

	Corporate Bonds		Equities
	Pre-Regulation	Post-Regulation	Entire Period
Reported Purchase Price	$102,000	$102,000	$100,000
Reported Mark-up / Commission	-	$2,000	$2,000

This table summarizes the information provided on customer trade confirmations for a $100,000 purchase and a $2,000 fee. In particular, we compare the information provided on a bond trade confirmation before FINRA amended Rule 2232 ("Pre-Regulation") to the information provided after the amendment ("Post-Regulation"). We contrast this to reporting requirements in the U.S. equities market over the entire period.

Appendix B. Variable Definitions

AD-Ratio

The fee that market professionals earn when selling bonds to investors, as a percentage of par. Calculated as follows:

$$Ask\text{-}Dealer\ Ratio^{s}_{i,t} = ln\left(\frac{P^{Ask}_{i,t,s}}{P^{Dealer}_{i,t,s}}\right)$$

$P^{Ask}_{i,t,s}$ is the dealer's par weighted-average sale price of bond i on date t in trade size category s. $P^{Dealer}_{i,t,s}$ is the par weighted-average dealer trade price of bond i on date t in trade size category s. Trade size s is small (less than or equal to \$100,000 par value) or large (greater than \$100,000 par value). Measured in basis points.

BD-Ratio

The fee that market professionals earn when buying bonds from investors, as a percentage of par. Calculated as follows:

$$Bid\text{-}Dealer\ Ratio^{s}_{i,t} = -ln\left(\frac{P^{Bid}_{i,t,s}}{P^{Dealer}_{i,t,s}}\right)$$

$P^{Bid}_{i,t,s}$ is the dealer's par weighted-average purchase price of bond i on date t in trade size category s. $P^{Dealer}_{i,t,s}$ is the par weighted-average dealer trade price of bond i on date t in trade size category s. Trade size s is small (less than or equal to \$100,000 par value) or large (greater than \$100,000 par value). Measured in basis points.

Coupon

The stated coupon rate of the bond, in percent.

Gross Markup

The total round-trip cost that investors incur to buy and sell a bond, as a percentage of the purchase price. We define the daily gross markup as:

$$Gross\ Markup^{s}_{i,t} = \frac{P^{Ask}_{i,t,s} - P^{Bid}_{i,t-j,s}}{P^{Bid}_{i,t-j,s}}$$

$P^{Ask}_{i,t,s}$ is the par-weighted average customer purchase price of bond i on date t in trade size category s. $P^{Bid}_{i,t-j,s}$ is the par-weighted average customer sale price of bond i on date $t-j$ in trade size category s. Each daily customer purchase, $P^{Ask}_{i,t,s}$, is uniquely matched with the nearest associated customer sale in prior trade dates up to a maximum of 7-calendar days. Trade size s is small (less than or equal to \$100,000) or large (greater than \$100,000 par value). Measured in basis points.

High Yield	An indicator variable equal to one if the security is rated below investment grade by both Moody's (below Baa3) and Standard and Poor's (below BBB-).
Issue Amount	The total par value of bond i on the date of issuance.
Post	An indicator variable equal to one after May 14, 2018, when FINRA amended Rule 2232 to require fee disclosures on retail investors' trade confirmations if an offsetting trade occurs on the same day.
Same Day	An indicator equal to one if the *Gross Markup* (defined above) is calculated using a buy and a sell that take place on the same day. Specifically, this variable takes a value of one if there are offsetting customer buy and sell transactions of the same security (i), on the same day (date t), in the same trade size category (s).
Small Trade	An indicator equal to one if the trade size is less than or equal to \$100,000 in par value.
Total Daily Volume	The natural logarithm of the total par value of all trades in bond i on date t.
Total Dealer Trades	The number of inter-dealer transactions in bond i on date t.
Total Purchase Volume	The total sum of customer purchases (by par value) associated with each $Gross\ Markup^{s}_{i,t}$ for bond i on date t in trade size s. Trade size s is small (less than or equal to \$100,000) or large (greater than \$100,000 par value). Measured in thousands of dollars.
Trade Size	The par value traded.
Years from Issue	The time between the date of trade and the bond's initial issuance date. Measured in years.
Years to Maturity	The time remaining to maturity on the date of the trade. Measured in years.

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Table 1
Sample selection and descriptive statistics of bond characteristics

Panel A: Sample selection

	Bonds	Trades
Full TRACE sample	40,885	15,808,404
Drop trades with missing CUSIP info	40,884	15,800,061
Removal of cancelled/corrected/duplicate trades	40,884	15,453,328
Mergent match	29,984	14,186,742
Drop privately issued and 144A securities	29,818	14,095,562
Drop adjustable rate, foreign denominated, perpetual, and convertible bonds	19,430	12,467,255
Drop trades with odd trade denominations	19,262	12,450,056
Remove trades with dollar prices greater than 150 or less than 50	19,012	12,410,965
Exclude trades within 1 year of bond maturity or 90 days of bond issuance	15,833	10,873,744

Panel B: Bond and trade characteristics

	$Mean$	$StDev$	$p^{25\%}$	$p^{50\%}$	$p^{75\%}$
Years to Maturity	7.35	6.91	3.01	5.06	8.15
Years from Issue	4.57	4.02	1.99	3.59	5.85
Coupon (%)	4.36	1.65	3.10	4.12	5.38
Issue Amount ($ BN)	1.20	1.00	0.50	1.00	1.50
Transaction Amount ($ 000s)	247.95	742.76	10.00	25.00	100.00

Panel A describes the sample selection process. See Section 3 for a detailed description of the sample construction. Panel B summarizes the fundamental characteristics of the 15,833 bonds in our sample. The sample period spans November 7, 2017, through November 21, 2018.

Table 2
Descriptive statistics of gross markups and pairwise correlations

Panel A: Descriptive statistics

	N	$Mean$	SD	$p^{25\%}$	$p^{50\%}$	$p^{75\%}$
Gross Markup (bps)	1,029,373	70.46	80.75	18.05	39.22	90.70
AD-Ratio (bps)	697,819	45.22	54.96	9.57	21.98	58.73
BD-Ratio (bps)	701,109	35.88	40.71	9.88	21.21	46.31
Total Purchase Volume ($ 000s)	1,029,373	643.26	1408.52	31.00	109.00	425.00
Same Day	1,029,373	0.62	0.48	0.00	1.00	1.00
Small Trade	1,029,373	0.65	0.48	0.00	1.00	1.00
High Yield	1,029,373	0.29	0.45	0.00	0.00	1.00
Years to Maturity	1,029,373	7.60	7.26	2.99	5.06	8.33
Issue Amount ($ BN)	1,029,373	1.02	0.80	0.50	0.75	1.30

Panel B: Pairwise correlations

	GM	ADR	BDR	TPV	SD	ST	HY	YTM	IM
Gross Markup (GM)		0.77	0.70	-0.33	-0.13	0.32	0.14	0.39	-0.38
AD-Ratio (ADR)	0.82		0.32	-0.21	0.01	0.23	0.12	0.34	-0.21
BD-Ratio (BDR)	0.72	0.34		-0.24	-0.04	0.28	0.11	0.27	-0.33
Total Purchase Volume (TPV)	-0.18	-0.15	-0.15		0.11	-0.61	0.01	-0.04	0.41
Same Day (SD)	-0.14	-0.02	-0.05	0.06		-0.01	0.03	-0.01	0.21
Small Trade (ST)	0.25	0.19	0.21	-0.58	-0.01		-0.07	-0.04	-0.20
High Yield (HY)	0.13	0.11	0.11	0.02	0.03	-0.07		0.09	-0.11
Years to Maturity (YTM)	0.38	0.36	0.26	0.10	-0.02	-0.08	0.01		-0.02
Issue Amount (IM)	-0.30	-0.18	-0.27	0.22	0.19	-0.18	-0.11	0.06	

Panel A provides descriptive statistics for the variables used in the paper. The unit of observation is the bond-day-size category. Our primary variable of interest, *Gross Markup*, is measured for each bond-day-size category in which a customer buy transaction can be matched to a customer sell transaction within seven calendar days. All other variables are defined in Appendix B. Panel B provides the pairwise Pearson (Spearman) correlations among these variables in the upper (lower) triangular region. All correlations are statistically significant at the 5% level of significance. The sample period spans November 7, 2017, through November 21, 2018, excluding the 2-week window surrounding the date FINRA amended Rule 2232 (May 14, 2018).

Table 3
Univariate changes in gross markup around fee disclosure

		Same-day			Non Same-day			Difference
		(a) Pre	(b) Post	(c) (b)-(a)	(d) Pre	(e) Post	(f) (e)-(d)	(g) (c)-(f)
(i)	Small trades	86.13	76.51	-9.62***	108.90	102.00	-6.90***	-2.72***
(ii)	Large trades	30.03	27.17	-2.86***	45.72	42.02	-3.70***	0.83
(i)-(ii)	Difference	56.1***	49.34***	-6.76***	63.18***	59.98***	-3.20***	-3.55***

FINRA amended Rule 2232 on May 14, 2018. The amendment applied to retail trades executed on the same day as an offsetting trade. Columns (a) through (c) summarize markups on same-day trades and Columns (d) through (f) summarize markups on non-same day trades, depending on whether the size of the trade is small (less than $100,000 in row (i)) or large (greater than $100,000 in row (ii)). The pre-disclosure period in Columns (a) and (d) spans November 7, 2017, through May 7, 2018, whereas the post-disclosure period in Columns (b) and (d) spans May 21, 2018, through November 21, 2018. Appendix B defines all variables. ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Table 4
Gross markup changes around fee disclosure

	Dependent variable: *Gross Markup*					
	Same day trades only		Small trades only		Full Sample	
	(1)	(2)	(3)	(4)	(5)	(6)
Post	−3.79***		−6.30***		−3.35***	
	(0.45)		(1.22)		(1.16)	
Small Trade	45.25***	47.34***			51.57***	39.05***
	(0.88)	(0.86)			(0.87)	(0.70)
Same Day			−15.29***	−7.02***	−9.56***	−17.61***
			(0.94)	(0.83)	(0.88)	(0.88)
Small Trade × Same Day					−6.25***	9.58***
					(0.99)	(0.74)
Post × Small Trade	−5.55***	−5.69***			−3.27***	−1.27
	(0.73)	(0.61)			(0.97)	(0.80)
Post × Same Day			−2.35**	−3.91***	−0.46	0.27
			(1.11)	(1.09)	(1.10)	(1.16)
Post × Small Trade × Same Day					−2.12**	−4.27***
					(1.03)	(0.84)
Years to Maturity	3.34***	−1.03	5.45***	8.90	3.74***	−4.42
	(0.10)	(5.32)	(0.13)	(7.45)	(0.09)	(5.66)
Years from Issue	3.14***	22.41***	3.42***	18.67***	3.10***	16.15***
	(0.17)	(7.19)	(0.16)	(5.77)	(0.14)	(5.37)
Total Dealer Trades	1.83***	1.02***	2.48***	1.08***	1.94***	1.03***
	(0.10)	(0.03)	(0.12)	(0.04)	(0.09)	(0.03)
Total Daily Volume	−8.09***	−1.65***	−9.40***	−0.62***	−8.56***	−1.26***
	(0.26)	(0.10)	(0.25)	(0.08)	(0.21)	(0.08)
Constant	100.50***		158.58***		113.09***	
	(3.86)		(3.58)		(3.07)	
Date fixed effects	No	Yes	No	Yes	No	Yes
Bond fixed effects	No	Yes	No	Yes	No	Yes
Observations	640,576	640,576	666,134	666,134	1,029,373	1,029,373
Adjusted R^2	0.27	0.51	0.25	0.53	0.29	0.52

This table examines the relation between explicit fee disclosure and gross markups on corporate bonds. The sample period spans November 7, 2017, to November 21, 2018, excluding the 2-week window surrounding the date FINRA amended Rule 2232 (May 14, 2018). The amendment applied to retail trades executed on the same day as an offsetting trade. The dependent variable, *Gross Markup*, is the total round-trip cost that investors incur to buy and sell a bond, as a percentage of the purchase price. Columns (1) and (2) are limited to same-day trades. The variable of interest is *Post × Small Trade*. *Post* is an indicator equal to one after May 14, 2018. *Small Trade* is an indicator equal to one if the par value traded is less than $100,000. Columns (3) and (4) are limited to small trades. The variable of interest is *Post × Same Day*. *Same Day* is an indicator equal to one if gross markup is calculated using a buy and a sell that take place on the same day. Columns (5) and (6) report results for the full sample. The variable of interest is *Post × Small Trade × Same Day*. Appendix B defines all variables. Robust standard errors, two-way clustered by bond and trade date, are reported in parentheses. ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Table 5
Cross-sectional variation in gross markup changes around fee disclosure

	Dependent variable: *Gross Markup*					
	High Yield		Maturity		Lo Size	
	(1)	(2)	(3)	(4)	(5)	(6)
Post	−2.72**		−0.54		−2.78**	
	(1.34)		(0.74)		(1.18)	
Small Trade	49.36***	33.72***	28.23***	29.86***	41.00***	36.61***
	(0.98)	(0.79)	(1.04)	(0.76)	(0.89)	(0.74)
Same Day	−9.14***	−13.10***	3.48***	−7.08***	−12.67***	−15.93***
	(1.03)	(0.94)	(0.68)	(0.76)	(0.89)	(0.91)
Var	18.66***	−5.80**	2.87***	−4.06	19.61***	
	(1.23)	(2.42)	(0.12)	(4.96)	(1.07)	(0.00)
Same Day × *Var*	−5.08***	−10.42***	−1.45***	−1.15***	−6.64***	−14.01***
	(1.27)	(1.23)	(0.12)	(0.12)	(1.05)	(1.19)
Small Trade × *Same Day*	−9.62***	6.33***	−14.87***	2.14**	1.62	9.01***
	(1.09)	(0.80)	(1.26)	(0.85)	(1.00)	(0.77)
Small Trade × *Var*	9.66***	19.24***	2.97***	1.23***	31.97***	12.29***
	(1.80)	(1.45)	(0.15)	(0.11)	(1.63)	(1.35)
Post × *Var*	−3.49***	−3.60***	−0.36**	−0.21	−2.02*	−1.15
	(1.34)	(1.21)	(0.15)	(0.16)	(1.15)	(1.02)
Post × *Small Trade*	−3.04***	−0.56	−2.57**	−2.97***	−2.49***	−2.60***
	(1.07)	(0.90)	(1.04)	(0.80)	(0.92)	(0.81)
Post × *Same Day*	−1.17	−1.00	−2.63***	−2.09***	−0.85	−0.13
	(1.28)	(1.28)	(0.75)	(0.80)	(1.12)	(1.17)
Same Day × *Small Trade* × *Var*	13.86***	5.27***	1.12***	0.87***	8.00***	11.96***
	(2.04)	(1.43)	(0.18)	(0.11)	(1.98)	(1.46)
Post × *Same Day* × *Var*	3.53**	4.02***	0.30**	0.28*	2.56**	2.52**
	(1.37)	(1.29)	(0.15)	(0.15)	(1.28)	(1.18)
Post × *Small Trade* × *Var*	−1.79	−4.32***	−0.03	0.25*	0.79	4.07***
	(1.69)	(1.49)	(0.16)	(0.13)	(1.64)	(1.38)
Post × *Small Trade* × *Same Day*	−0.45	−3.04***	0.19	−0.75	−2.25**	−2.83***
	(1.17)	(0.95)	(1.19)	(0.91)	(0.96)	(0.80)
Post × *Small Trade* × *Same Day* × *Var*	−5.71***	−2.81*	−0.36**	−0.44***	−3.66	−4.81***
	(1.82)	(1.54)	(0.18)	(0.14)	(2.26)	(1.83)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Date fixed effects	No	Yes	No	Yes	No	Yes
Bond fixed effects	No	Yes	No	Yes	No	Yes
Observations	1,029,373	1,029,373	1,029,373	1,029,373	1,029,373	1,029,373
Adjusted R^2	0.31	0.52	0.32	0.53	0.33	0.52

This table examines cross-sectional variation in the relation between explicit fee disclosure and gross markups on corporate bonds. The sample period spans November 7, 2017, to November 21, 2018, excluding the 2-week window surrounding the date FINRA amended Rule 2232 (May 14, 2018). The amendment applied to retail trades executed on the same day as an offsetting trade. The dependent variable, *Gross Markup*, is the total round-trip cost that investors incur to buy and sell a bond, as a percentage of the purchase price. The variable of interest is *Post* × *Small Trade* × *Same Day* × *Var*. *Post* is an indicator equal to one after May 14, 2018. *Small Trade* is an indicator equal to one if the par value traded is less than $100,000. *Same Day* is an indicator equal to one if gross markup is calculated using a buy and a sell that take place on the same day. In Columns (1) and (2), *Var* is an indicator equal to one if the bond is non-investment grade (*HY*). In Columns (3) and (4), *Var* is equal to the time remaining to maturity, in years. In Columns (5) and (6), *Var* is an indicator equal to one if the bond issuance is below $500 million. Appendix B defines all variables. Robust standard errors, two-way clustered by bond and trade date, are reported in parentheses. ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Table 6
Fee disclosure avoidance

	Dependent variable:			
	Same Day		Total Purchase Volume	
	(1)	(2)	(3)	(4)
Post	−0.01*		5.48	
	(0.01)		(15.40)	
Small Trade	0.17***	0.15***	−797.31***	−895.51***
	(0.01)	(0.01)	(13.15)	(14.05)
Same Day			484.39***	461.98***
			(19.43)	(17.38)
Small Trade × *Same Day*			−686.52***	−585.29***
			(22.21)	(19.71)
Post × *Small Trade*	0.01	0.01	−8.37	8.73
	(0.01)	(0.01)	(18.41)	(18.62)
Post × *Same Day*			−30.50	−45.45**
			(21.93)	(19.44)
Post × *Small Trade* × *Same Day*			46.81**	50.45**
			(22.79)	(21.26)
Sample	Same Day	Same Day	Small Trades	Small Trades
Controls	Yes	Yes	Yes	Yes
Date fixed effects	No	Yes	No	Yes
Bond fixed effects	No	Yes	No	Yes
Observations	1,029,373	1,029,373	1,029,373	1,029,373
Adjusted R^2	0.13	0.20	0.38	0.42

This table examines whether market professionals avoid disclosing markups to investors. The sample period spans November 7, 2017, through November 21, 2018, excluding the 2-week window surrounding the date FINRA amended Rule 2232 (May 14, 2018). The amendment applied to retail trades executed on the same day as an offsetting trade. The dependent variable in Columns (1) and (2) is an indicator equal to one if the gross markup is measured using a buy and a sell that take place on the same day. The dependent variable in Columns (3) and (4), *Total Purchase Volume*, is the total par volume of customer purchases associated with each $Gross\ Markup^s_{i,t}$ for bond i on date t in trade size s. *Post* is an indicator equal to one after May 14, 2018. *Small Trade* is an indicator equal to one if the par value traded is less than $100,000. *Same Day* is an indicator equal to one if gross markup is calculated using a buy and a sell that take place on the same day. All other variables are defined in Appendix B. Robust standard errors, two-way clustered by bond and trade date, are reported in parentheses. ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Table 7
Parallel trends and Robustness

	Dependent variable:							
	Gross Markup				Alt. Markup Measure			
	Group Time Trend		Placebo		AD-Ratio		BD-Ratio	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Post	0.79		−9.57***		−3.54***		−2.79***	
	(1.72)		(1.24)		(0.86)		(0.43)	(0.00)
Small Trade	50.30***	38.39***	63.99***	51.76***	22.31***	15.57***	17.82***	12.26***
	(1.08)	(0.87)	(1.07)	(0.88)	(0.76)	(0.63)	(0.42)	(0.36)
Same Day	−9.54***	−17.60***	−15.21***	−24.42***	−4.02***	−5.97***	3.31***	−0.37
	(0.88)	(0.88)	(1.01)	(1.05)	(0.64)	(0.51)	(0.39)	(0.30)
Small Trade × *Same Day*	−6.31***	9.57***	−8.28***	9.14***	4.93***	11.88***	−2.84***	4.04***
	(0.99)	(0.74)	(1.20)	(0.89)	(0.76)	(0.59)	(0.50)	(0.37)
Post × *Small Trade*	−6.02***	−2.65**	−8.93***	−8.98***	−0.25	0.13	−2.70***	−1.94***
	(1.58)	(1.23)	(1.08)	(0.89)	(0.84)	(0.68)	(0.49)	(0.43)
Post × *Same Day*	−0.42	0.28	4.32***	4.74***	0.65	1.12*	−0.20	0.45
	(1.09)	(1.16)	(1.21)	(1.26)	(0.77)	(0.58)	(0.46)	(0.35)
Post × *Small Trade* × *Same Day*	−2.13**	−4.29***	1.29	−0.02	−1.26	−2.30***	0.20	−0.83*
	(1.02)	(0.84)	(1.14)	(0.93)	(0.81)	(0.67)	(0.57)	(0.47)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Date fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
Bond fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
Observations	1,029,373	1,029,373	1,009,817	1,009,817	697,819	697,819	701,109	701,109
Adjusted R^2	0.29	0.52	0.32	0.55	0.18	0.37	0.18	0.36

This table presents the results of robustness and falsification tests. The dependent variable in Columns (1) through (4), *Gross Markup*, is the total round-trip cost that investors incur to buy and sell a bond, as a percentage of the purchase price. In Columns (5) and (6) (Columns (7) and (8)) the dependent variable, *AD-Ratio* (*BD-Ratio*), is the ratio of the customer purchase (sale) price that customers pay (receive), relative to the price at which dealers transact with one another. The variable of interest is *Post* × *Small Trade* × *Same Day*. *Post* is an indicator equal to one after May 14, 2018. *Small Trade* is an indicator equal to one if the par value traded is less than $100,000. *Same Day* is an indicator equal to one if gross markup is calculated using a buy and a sell that take place on the same day. In Columns (1) and (2), we include a group-specific linear time trend. In Columns (3) and (4), we use a placebo sample period, spanning November 7, 2016, to November 21, 2017. FINRA amended Rule 2232 on May 14, 2018. Our *Post* variable in columns (3) and (4) is an indicator equal to one after May 14, 2017, which is exactly one year before FINRA began requiring market professionals to disclose fees explicitly. All other variables are defined in Appendix B. Robust standard errors, two-way clustered by bond and trade date, are reported in parentheses. ***, **, and * denote significance at 1%, 5%, and 10%, respectively.