Receiving Investors in the Block Market for Corporate Bonds *

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Abstract

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JEL Classification: G14, G18, G24

Keywords: Block market, dealer, trading cost, transparency, asymmetric information.

1. Introduction

In the corporate bond market, institutional investors frequently transact in quantities that far exceed the standard round lot size of $1 million. As shown in Figure 1, transactions exceeding $15 million have accounted for nearly 15% of trading volume over the past two decades. While trading has slowly migrated to electronic bond platforms, they primarily cater to retail investors and small institutional trades (O'Hara and Zhou, 2021). For the large institutional trades, the over-the-counter (OTC) block market represents an important source of liquidity. Block trading typically involves a sequence of negotiated, non-anonymous, and asynchronous transactions: an "initiating" block trade between the institution and the dealer, typically facilitated in a principal capacity, followed by the dealer executing offsetting trades with "receiving" investors to reverse the block position.

Receiving investors play an important role in the theoretical models of the block market, yet they have received little attention in the empirical literature. Theoretical models, such as those by Burdett and O'Hara (1987), Naik et al. (1999) and Back et al. (2020), depict a setting in which a dealer acquires and subsequently disposes of a block position through a sequence of transactions. Given that informed traders tend to transact in larger quantities, information asymmetry plays a crucial role in the block market. In these models, the dealer typically possesses less information than the block initiator, but the dealer may learn (at least partially) about the trade's motive by observing the block size, price, initiator identity, and other signals during bilateral negotiations. The least informed is the receiving investor who is approached by the dealer interested in trading out of the block position. In the framework of Burdett and O'Hara (1987), receiving investors lack information regarding the existence and size of the yet-to-be-reported block trade, thus making it difficult for them to fully anticipate its information effects.

Receiving investors (henceforth, receivers), who offset the dealers' added inventory risk of the block position, are vital to a well-functioning block market. Their significance has grown as dealers have been less inclined to commit capital for market-making due to post-crisis banking regulations.[1] In this study, we study the economics underlying receiver participation in the block market. Our results suggest that receivers

[1] See Schultz (2017), Bao et al. (2018), Bessembinder et al. (2018), Dick-Nielsen and Rossi (2019), and Trebbi and Xiao (2019) for the impact of Dodd Frank Act on bank-affiliated dealers in the corporate bond market.

experience worse outcomes in settings with elevated information asymmetry within the block trade process. Receivers choose to participate when the expected losses due to adverse selection are lower than the cost of initiating a trade of similar size.

Our study highlights the important role of information environment on the health of the OTC block market. Much of the regulatory debate about the block market design has revolved around block initiators and dealers, whereas the welfare of receiving investors has received less attention. We show that, consistent with theoretical predictions, disclosure of the block trade conveys private information to the market, thus improving the terms that receivers obtain from the block dealer. Our study holds relevance for recent regulatory proposals related to timeliness of trade disclosure, which are likely to benefit some participants at the expense of others, as noted by Harris (1992).

While there is extensive empirical work on trading costs for large transactions, few studies have differentiated between specific types of customers (i.e., initiators vs. receivers). Unlike many markets in which the parties to a trade are not identified (e.g., TAQ data from U.S. equity), the enhanced TRACE transaction data in the corporate bond market capture the entire history of the dealers' trades with counterparties. We leverage these unique data features to develop a methodology for identifying the initiating block trade and the related transactions with receivers.[2] Building on the block literature (e.g., Kraus and Stoll, 1972), we estimate both the temporary (liquidity effects) and permanent (information effects) price impact of block trades, and further, using our methodology, decompose liquidity effects into dealer and receiver spreads.

We first characterize the price effects of block trades. Our analysis focuses on a sample of 205,104 "initiating" block buy and sell transactions, each exceeding $15 million, as well as 690,418 related offsetting trades with receivers. These transactions span the years from 2002 to 2021. Notably, dealers typically offset a block position with about 3-4 counterparties, with the trade size averaging $9 million, suggesting that receivers predominantly represent institutions. Round-trip dealer spreads for intermediating

[2] Outside of the block market setting, it can be challenging to classify customer trades as initiating investor trades (i.e., trades that add to dealers' inventory risk) versus receiving investor trades (i.e., trades that offset dealers' inventory position). Identifying the initiating investor trade is important for measuring price effects and its distribution among the different market participants.

block trades average 22 basis points (bp). Dealers charge a markup on both the initiator (18 bp) and receiver (3 bp) legs of their round-trip trades. Receivers obtain better terms for participating in lower quality bonds and larger blocks, and in particular, for mega blocks involving high yield bonds. These patterns indicate that dealers attract counterparties with better terms when facing substantial inventory risk.

We find that adverse selection costs in the block market are borne primarily by receivers. The average (median) permanent price impact for corporate bond blocks is near zero (1.4 bp), which is substantially lower than those documented for equities; however, the 66^{th} and 75^{th} percentile of permanent price impact are 25 bp and 52 bp, respectively, suggesting that many blocks are associated with information. When we sort the blocks into decile portfolios based on the block's ex-post permanent price impact, receivers experience less favorable outcomes for informed blocks while dealers' spreads remain relatively unaffected. These patterns indicate that dealers can anticipate informed trading and manage the adverse selection risk.

Prior evidence from the corporate bond market suggest that sustained customer buying is associated with price discovery while sustained customer selling is associated with price reversals (Cai et al., 2019; Anand et al., 2021). For our sample, block buys appear to be informed, as evidenced by positive permanent price impact (7 bp), compared to block sells, which have negative impact (-4 bp). For both block buys and sells, dealer spreads exhibit positive values of comparable magnitude. In contrast, receivers experience less favorable outcomes when blocks are associated with information. For block buys, receivers bear adverse selection, as evidenced by negative receiver spreads (-12 bp), while for block sells, where information effects are largely absent, receiver spreads are slightly positive (1 bp).

Given adverse selection costs are borne by receivers, what explains their decision to participate in the block market? Grossman (1992) describes receivers as natural counterparties of the block initiator with unexpressed trading interests that are known to the dealer. In this context, we compute "imputed" costs, or the hypothetical cost if the receiver had instead *initiated* a trade of similar size at the same time. Notably, even with information effects, receivers obtain better outcomes (+20 bp for building a position), or at the very least, no worse outcome (+1 bp for liquidating a position) by offsetting the dealers' position than initiating a trade of similar size.

Our findings help explain the appeal of the block market for receiving investors, supporting Burdett and O'Hara (1987) prediction that despite potential losses on informed blocks, participation can be optimal for investors seeking to either establish or liquidate a large position. Our results highlight the necessary conditions for a well-functioning block market; that is, if information asymmetry becomes excessively large, receivers will withdraw from the block market.

Next, we explore how regulations that affect the information environment impact the block market. Our analysis begins with a study of the introduction of trade reporting for public corporate bonds in 2003, 2004 and 2005, as well as non-public 144A corporate bonds in June 2014. In line with empirical literature, we find that the initiation of trade reporting reduces dealer profits in the block market.[3] However, the impact of trade reporting on block market customers is nuanced and depends on "type". Consistent with theory, such as Madhavan (1995), our results indicate that increased transparency benefits the less-informed customers (receivers) in their negotiations with dealers while outcomes remain largely unaffected for the better-informed customers (initiators).

In our second analysis, we exploit variations in trade reporting procedures that allow dealers a delay between the time of execution and the reporting of a block trade to the TRACE system. The timing in trade report disclosure lies at the heart of numerous policy debates surrounding the structure of bond markets. Dealers and industry groups have long argued that real-time block trade reporting makes it difficult to unwind a block position over time. The delay provides dealers with an opportunity to partially offset the block position before it is reported to the market. In recent years, regulators have explored a range of proposals, including extending the reporting delay for block trades from the current 15 minutes to 48 hours[4], as well as reducing the delay from 15 minutes to no more than one minute.[5]

Between 2003 and 2006, FINRA implemented a gradual reduction in the maximum stipulated

[3] See, e.g., Bessembinder et al. (2006), Edwards et al. (2007), Goldstein et al. (2007), and O'Hara et al. (2018).
[4] FINRA (in 2019) and the CFTC (in 2020) proposed pilot programs to delay reporting of block trades in corporate bonds and swaps, respectively from 15 minutes to 48 hours (see https://www.finra.org/rules-guidance/notices/19-12 for FINRA proposal and https://www.cftc.gov/LawRegulation/FederalRegister/finalrules/2020-21568.html for CFTC proposal).
[5] The FINRA proposal (in 2022) covers trade reporting in corporate bonds, agency debt securities, asset backed securities and agency pass-through mortgage-backed securities (MBS). See https://www.finra.org/rules-guidance/notices/22-17.

reporting delay for corporate bonds in three stages, from 75 minutes to 45 minutes, to 30 minutes, to the current 15 minutes. The Back et al. (2020) model predicts that receivers will obtain more favorable terms on offsetting trades that take place after the disclosure of the block trade compared to those before it. We present related evidence through a "within block" analysis, which allows us to control for trade, bond issue, and market conditions that may also impact trading costs. Within each reporting delay regime, receivers obtain economically large cost reductions (within block), ranging from 5 bp to 11 bp, on offsetting trades that occur after the block trade report compared to those before the report. Changes in dealer spreads exhibit a similar pattern but with opposite signs. Our results highlight the relevance of the design of the disclosure regime – markets can be post-trade transparent, but when reporting is delayed, transparency is less consequential.

As reporting delay shortens, dealers reverse the block position at a faster rate, strategically offsetting approximately 20% of the position before the block trade report across all trade delay regimes. Dealers are also strategic in the timing of report: more difficult block trades (e.g., mega blocks in high yield bonds) are associated with longer reporting delay. In the concluding section, we discuss the implications of our research for recent regulatory proposals on trade disclosure delay.

Our Study versus the Related Literature

Madhavan (2000) argues that the block market has been viewed in the literature primarily from the initiator's viewpoint, but the benefits may largely accrue to receivers. While there is research on trading costs of large transactions, it is difficult to test theoretical predictions concerning specific customer-types. Most publicly available databases do not identify investor-types, and the hypothesized relation may be obscured in the available transactions data which represent a mixture of investors. As a result, even the most fundamental theoretical predictions regarding receivers remain untested. Our study attempts to fill this gap in the literature.

Our study is related to the literature on search frictions and the value of trading relationships in the fixed income market. Hendershott et. al (2020a & 2020b) and Kargar et. al (2022) document high search costs, frequent and costly trade failure, and execution delay, indicating that receivers could potentially lower the opportunity cost of non-execution by participating in the block market. Other studies show that customer

trading costs are lower on trades with a relationship dealer (Hendershott et al., 2020b; O'Hara et al., 2018; Nikolova and Wang, 2020; Goldstein et al., 2021; Jurkatis et al., 2022), suggesting that dealers reward clients to whom they can offload inventory positions. We extend the literature by developing a methodology to identify the sequence of related trades and show that the block market could potentially lower explicit costs for receivers with a desire to build or liquidate positions (in the near-term) relative to initiating a similar-size trade, as predicted by Burdett and O'Hara (1987). Our results explain the appeal of the block market for receivers and identify conditions for a well-functioning block market.

Our work complements Li et al. (2022), who study portfolio trading, which involves dealers bidding for a basket of bonds to be executed simultaneously. Although the portfolio trade size is significant ($61 million), the typical portfolio contains more than 100 bond issues with individual bond trade size of about $540,000. Thus, our study examines blocks that facilitate entry or exit in an individual bond, while their study examines blocks that facilitate large-scale portfolio adjustments. Our study is related to Choi et al. (2023), who study a setting where corporate bond dealers match customers in an agency capacity within a short horizon (i.e., trades that do not require dealer inventory). The study differentiates between liquidity demanding and liquidity providing customers and shows that traditional measures underestimate trading costs due to the aggregation of customer types. In comparison, we analyze a setting where dealers hold the block in inventory and study how dealers interact with their customers who receive the block.

We are also able to shed light on the primary mechanism envisioned in theoretical models (e.g., Naik et al., 1999; Back et al., 2020) on how transparent regimes level the information playing field. With greater transparency, theory predicts that counterparties will incorporate the potential adverse price move of a block trade as the dealer continues to offset the position. We exploit variations in trade reporting rules to present evidence for this mechanism, and further, identify the customer-type that benefit from greater transparency, adding nuance to existing literature.

2. Related Literature on the Block Market and Transparency

The block market represents a setting where information asymmetry and inventory risk are particularly elevated. Because a large trade may signal information-motive (Easley and O'Hara, 1987),

dealers must discern whether the block initiator is informed. Dealers must also consider the ease of locating receivers and the price at which the block can be distributed.

As per theory, the block market can lower the initiator's trade execution costs by mitigating adverse selection risk (Seppi, 1990), locating counterparties (Grossman, 1992), and facilitating risk sharing (Keim and Madhavan, 1996). Researchers, focusing on block trades in the equity market, have provided evidence in support of these models. Madhavan and Cheng (1997) and Booth et al. (2001) report evidence from U.S. and Canadian equity markets, respectively, that "upstairs" block market trades are primarily liquidity motivated, Bessembinder and Venkataraman (2004) report lower liquidity costs for block trades in the French equity market, and Keim and Madhavan (1996) report lower price effects of block trades due to risk-sharing based on U.S. equity institutional trade data.

2.1. Large Trades in the Corporate Bond Market

Like the equity market, the initiator and dealer negotiate the terms of the block trade in the corporate bond market. One notable distinction is that the "downstairs" market, where the initiator could split a block and trade in smaller pieces, is an organized, anonymous exchange for equities, while it primarily operates as non-anonymous OTC market for corporate bonds. For this reason, it can be difficult for informed bond traders to hide a large position during bilateral negotiations with counterparties.[6] Moreover, unlike equities, where trading costs increase with trade size, larger trades in corporate bonds tend to incur lower costs compared to smaller trades (see Edwards et al., 2007; Goldstein et al., 2007), which reduces the incentive to split a block position.

Prior corporate bond studies find that institutions prefer to trade in large quantities with a handful of relationship dealers (Di Maggio et al., 2017; O'Hara et al., 2018; Hendershott et al., 2020b; Nikolova and Wang, 2020; Goldstein et al., 2021) and that larger trades are more informed than smaller trades (Han and Zhou; 2014). Thus, it appears that order splitting is less common in corporate bonds than in equities, although Czech and Pintér (2020) report evidence of order splitting across multiple dealers in the UK

[6] Adverse selection risk could reflect differences among dealers in their ability to screen informed initiators from the block market (Seppi (1990)), or that dealers may misrepresent the risk to their less-favored customers. Since receivers repeatedly interact with the same dealers, they can (ex-post) monitor adverse selection and avoid dealers who regularly intermediate informed order flow.

market. Goldstein and Hotchkiss (2020) find that dealers' holding period declines with illiquidity and bond risk, indicating that dealers care about inventory and search costs. O'Hara et al. (2018) show that dealers exercise market power – more active institutions receive better trade terms than less active institutions. For asset-back securities and municipal bonds, Hollifield et al. (2017) and Li and Schurhoff (2019), respectively, show that dealer's centrality is an important determinant of the terms of trade for customers.

2.2. Transparency and the Block Market for Corporate Bonds

Every block trade involves receivers who, in due course, reverse the large position of the dealer. As per theory, the surplus that dealers extract from receivers in bilateral negotiations increases with the extent of asymmetric information within the block trade process, for example, when the initiator is an informed trader, or in opaque markets, where ex-post details on completed transactions are not available to all market participants.

FINRA adopted a phased approach to corporate bond trade dissemination that began with the most actively traded bonds in 2002, then expanded in stages to all non-144A corporate bonds by 2006 and finally to 144A corporate bonds in June 2014. As per theory, initiation of trade reporting diminishes the dealers' advantage by making public valuable information about recent trading activity in the bond or related bonds.[7] In the context of the block market, which typically involves a sequence of trades between initiator, dealer and receivers, trade reporting conveys the dealer's private information on a recently-executed block trade to the market, allowing the potential counterparties to learn (at least partially) about the trade's motive by observing the terms of the block trade. Trade reporting also makes dealers with recently acquired blocks more vulnerable to adverse price movements from front-running strategies.

The experimental evidence from Bloomfield and O'Hara (1999) suggests that dealers prefer not to disclose their trades and that non-disclosing dealers earn substantially higher profits than disclosing dealers. Empirical research generally has found that customer trading costs have improved, while dealer spreads have declined with initiation of trade reporting in corporate bonds (Edwards et al., 2007; Goldstein et al.,

[7] Pagano and Roell (1996), Green et al. (2007) and Back et al. (2020), among others, show theoretically that opaque markets offer advantages to dealers in negotiations with less informed customers. Duffie et al. (2017) show that the publication of benchmark prices reduce the information advantage of dealers over customers.

2007). Institutional trading costs also decline along with smaller differences in costs between large and small institutions after trade report initiation (see Bessembinder et al., 2006; O'Hara et al., 2017). Brugler et al. (2022) find that post-trade transparency lowers the cost of issuing corporate bonds. For municipal bonds, Schultz (2012) finds a reduction with transparency in dispersion of purchase prices around bond issuance and for agency mortgage-backed securities, Schultz and Song (2019) report a reduction in trading costs for institutions following trade reporting. However, for stocks trading on the London Stock Exchange between 1986 and 1996, Gemmill (1996) reports that bid-ask spreads did not materially change across trade reporting regimes.

Dealers are allowed a delay between execution time of the trade and report time of the trade to FINRA's TRACE system. Current TRACE procedures require dealers to report immediately to the TRACE system but in no case later than 15 minutes after trade time, but TRACE rules shortened the maximum stipulated reporting delay in three stages, from 75 minutes when TRACE was initiated in 2002, to 45 minutes, to 30 minutes, to the current 15 minutes in 2006. In all four regimes, FINRA disseminates the trade report to the market immediately upon receipt from a dealer.

Theoretical models predict that shortening the trade reporting delay could make the dealers' position more vulnerable to price movements that negatively impact profits and incentivize dealers to offset the block at a faster rate. To the extent that dealers are unable to distribute the position quickly, it may reduce dealers' incentive to intermediate blocks or offer less attractive quotes to block initiators. Chalmers et al. (2021) examine the reduction in trade reporting delay for municipal bonds and find declines in average customer trading costs; however, the study does not examine the block market or the outcomes for different customer-types within the intermediation process.

3. Data and Sample Characteristics

3.1. Data Sources and Sample Construction

We use the Mergent Fixed Income Securities Database (FISD) to select our initial sample of corporate bonds. We identify non-puttable or convertible U.S. Corporate Debentures and U.S. Corporate

Bank Notes (bond type=CDEB or USBN) with complete issuance information (offering date, amount, and maturity), resulting in an initial sample of 55,842 bonds.[8]

For corporate bond transactions, we use the enhanced version of the Trade Reporting and Compliance Engine (TRACE) data provided by FINRA that include dealer identification numbers, unmasked trade sizes, and trade data disseminated to the public as well as (144A bond) trades not so disseminated between July 2002 and November 2021. We match the FISD data to TRACE using the CUSIP identifier, which reduces the sample to 39,801 bonds and 147.9 million trades.

Table I reports the effects of additional data filters that we implement. We exclude all bonds with less than five trades during the almost twenty-year sample period. We also exclude trades with reported size that exceeds the bond's offering amount, trades reported after the bond's outstanding amount is reported as zero, and trades with execution dates prior to July 2002. We exclude trades reported as primary market transactions as well as secondary market transactions that occur immediately after issuance.[9] Finally, following the literature, we exclude trades by one relatively large dealer that, during 2014, began to report an immediately offsetting transaction for most of its principal trades with an affiliated offshore entity. With these filters imposed, the corporate bond sample comprises of 138.5 million secondary market transactions in 38,762 distinct CUSIPs.

3.2. Block Market Activity Through Time

Figure 1 shows the market share of block trades, defined as a single transaction with par value of at least $15 million, to total trading volume on TRACE for the sample of corporate bonds over 2002-2021. We also report the market share for block size thresholds of $20 million and $30 million. During this period, the corporate bond market experienced many significant events, such as the phase-in of trade reporting (2002-2005), the global financial crisis (2007-2009), post-crisis bank regulations (2011-2014), and the growth in electronic trading venues. Throughout these developments, the market share of block trades has

[8] Specifically, we exclude the following types of debt: retail notes, foreign government, agency, municipal, pass-through trusts, pay in kind, strips, zeros, Eurobonds/Euronotes, asset and mortgage backed, insured, and guaranteed by letters of credit, medium term notes/zeros, convertible, and foreign currency.

[9] Bessembinder et al. (2022) show that secondary market trading in a new issue in the days following issuance is dominated by the activities of the underwriting syndicate. If the offering day is on or before the 15th of the month we exclude the remainder of the issue month, otherwise we exclude the issue month and the following month.

remained remarkably stable, averaging about 13% over the sample period (Figure 1.A). The market share is higher for investment grade bonds than high yield bonds (Figure 1.B) and for large dealers than small dealers (Figure 1.C). We find that the dealer's propensity to "prearrange" block trades has remained stable, averaging about 11% of the block volume, over the sample period (Figure 1.D.).[10]

In Appendix Figure 1, these block market trading activity patterns are similar when we account for changes in bond attributes and market conditions using a regression framework over the sample period.[11] Overall, we do not find support for industry concerns that the block market in corporate bonds has become less relevant over time.

3.3. Identifying Block Trades and Receiver Trades in TRACE data

The goal of this study is to understand outcomes for receiving investors to whom the dealer distributes the block. We leverage unique features of the corporate bond market to link the initiating block trade with the dealer's offsetting trades with receivers. The enhanced TRACE corporate bond transactions data that we utilize includes identifiers for buy and sell trades and dealer identification codes, which allow us to track the entire trading activity of a dealer.

To be included in our sample, the block trade must meet the following conditions: the block trade is a dealer's sale or purchase with a customer with par value of $15 million or greater (or $20 million or $30 million for the alternate samples), and the block trade is not reported as an "agency" trade on TRACE or identified as a prearranged trade by our matching algorithm. When the dealer acts as a broker (i.e., agency or prearranged block trades), it becomes ambiguous whether the initiating block trade was a customer buy

[10] Following the literature, we define pre-arranged blocks as "riskless principal" trades when the dealer fully offsets the block position with a single opposite direction trade within 15 minutes, effectively acting in an agency capacity (see Harris, 2016; Choi et al., 2023). Bessembinder et al. (2018) report that more than 90% of dealer-to-customer trades each year between 2006 and 2016 were facilitated as "principal" (i.e., not prearranged) trades by dealers.

[11] Specifically, we regress the weekly block volume share (i.e., aggregate block volume relative to total trading volume) on the (average) characteristics for bonds traded during the week (i.e., log age, log issue size, and the percentage of traded bonds that are high yield, financial sector, and 144A bonds) and several measures of market conditions (i.e., the trailing weekly corporate bond market index return and S&P index return, and the average three-month LIBOR interest rate and the level of the VIX index over the preceding five days). Appendix Figure 1 shows the regression coefficients of the year indicator variables (circles) and the 95% confidence interval (bars) from the model with 1,023 weekly observations and with Newey-West standard errors. Years 2002 and 2003 serve as the benchmark period. Appendix Figure 1.A indicates no significant change in the block market volume share relative to the benchmark period. Appendix Figure 1.B shows that the percentage of prearranged block trades is higher during the global financial crisis, consistent with a decline in intermediary capital, but the subsequent years exhibit no significant change relative to the benchmark period.

or sell. Our approach allows us to identify with high confidence the initiating block trade, reported as a customer buy or sell, which creates a material inventory position for the dealer.

We identify the dealers' offsetting trades of the block trade with receivers, as follows. We first retain all trades by the block dealer in the bond during the week (i.e., five trading days) after the block trade.[12] We then, starting with block volume, cumulate the dealer's (signed) trading volume in the bond. If the cumulative imbalance reaches or crosses zero over the block week, we classify the block as being "fully offset". We define the "block end" time as the earlier of the time the block is fully offset or the end of the block week.[13] Receiver trades are identified as those that offset the dealer's block position before the block end time.

We categorize the *earliest* large trade as the "trigger" or "initiating" block trade; thus, additional (opposite sign) block trades in the bond by the same dealer that occur until the block end time are classified as receiver trades. Subsequently, any trade by the dealer in the bond that meets the block definition is classified as an initiating block trade. If there is insufficient data to calculate price effects (described in Section 4), we exclude the block trade and the associated receiver trades from our sample.

Panel B of Table I reports summary statistics for our sample of 205,104 block trades over our sample period, of which 71% (146,052) represent investment grade bonds and 29% (59,052) represent high yield bonds. The majority (80%) of block trades are intermediated by large dealers. The average block size (par value) for the main sample is $22.6 million, while for the mega-block sample, the average block size is $44.4 million. The average block trade size as a percentage of the total trading volume for the bond on the block trade day is 51%.

[12] As an example, if the block trade occurs on a Wednesday, the block week is from Wednesday to Friday, and the following Monday to Tuesday.

[13] We focus on one week for two reasons. First, it is a reasonable window based on existing evidence. Bessembinder et al. (2018) show that the proportion of weekly trading volume that is carried into dealers' weekend inventory is generally less than 10%. Goldstein and Hotchkiss (2020) report median (mean) dealer holding periods of one (ten days). Hollifield et al. (2020) show more than 70% of large trades are matched within a week. Second, as the time from block trade increases, the link between a triggering block trade and the dealers' offsetting trades of opposite sign becomes less clear.

Our analysis relies on the correct identification of trade type. Misclassification may arise from our assumption that the earliest block trade is the initiating trade.[14] We undertake several additional analyses to assess this assumption. First, in Figure 2, we report the mean and median signed end-of-day cumulative imbalance in the bond for the dealer over [-10, +10] days surrounding the block trade date (time 0). The analysis is based on the sample of 205,104 block trades reported in Table 1. The dealers' signed end-of-day position is close to zero prior to the block trade date, which suggests that dealers' do not build a position in anticipation of a block trade. On the block day, dealers' closing position averages $12.5 million for block sells and -$7.9 million for block buys, while in comparison the average block trade size is $22.6 million. Thus, dealers offset a significant portion of the block within the block day, and then continue to offset the block position on subsequent trading days.

Second, our main results are similar for three block size threshold samples. The robustness is relevant because the three samples are selected independently. That is, for each block size category (i.e., $15-20 million, $20-$30 million, and greater than $30 million), we first identify the sample of initiator blocks that meet the corresponding dollar threshold and then apply our methodology to identify receiver trades.[15] Further, because the size of the receiver trades is typically smaller than the initiating block trade, particularly for mega blocks of $30 million or more, it is less likely that the block is incorrectly classified as "initiating" instead of "receiving". Third, FINRA's reporting rules stipulate 15 minutes as the maximum reporting delay for the majority of the sample period. Thus, when the difference in execution timestamp between the initiating block and the receiver trades exceed the stipulated reporting delay, it is unlikely that our approach leads to misclassification. Fourth, the percentage of fully offset blocks where at least one receiver trade exceeds the block trade size and occurs on the same day (within 15 minutes) as the initiating block is only 6% (0.8%). In Appendix Table II, our main results are robust when we exclude these block

[14] As an example, if we observe a $15 million customer buy followed by a $25 million customer sell, the "initiating block" for the $15-20MM category is the $15 million customer buy and the "initiating block" for the $20-$30MM category is the $25 million customer sell.

[15] As a result of this resampling, the sum of the number of block trades in the three categories do not equal the number reported for the full sample (205,104). We present many examples of our classification in Appendix I. In the main text, we report most results for each block size category and reach similar conclusions.

trades from the sample. The Appendix describes classification issues and the methodology in detail and presents several examples of trade classification.

In Table II, Panel A, we report summary statistics for our sample of receiver trades. We identify 690,418 receiver trades associated with the block trade sample, implying that each block trade is associated on average with 3.37 receiver trades. Of the 205,104 block trades, 72% (148,601) are associated with more than one receiver trade (77% for mega block sample). The majority of receiver trades (71%) are with customers. This result is consistent with Hollifield et al. (2020) who find that smaller trades of a dealer are substantially more likely to be offset with other dealers, while larger trades are more likely to be offset with customers.

Panel B reports that, at the block-level, the weighted average receiver trade size is $8.9 million while, in comparison, the average TRACE-reported trade size during our sample period is only $0.5 million. At the individual receiver trade level, 34% of trades are less than $1 million, 54% are between $1 and $15 million and 12% exceed $15 million. This distribution suggests that consistent with block market theory, receiving investors are primarily institutions. Both the average receiver trade size and the number of receiver trades increase with block size. For mega-blocks, the weighted average receiver trade size is $15.6 million (Panel B) and the number of receiver trades average 4.04 (Panel A). Panel C reports that the percentage of the block position that the dealer offsets during the block-week averages 64%. About 41% of the blocks are fully offset during the block-week and this statistic is slightly higher (44%) for smaller blocks.

4. Price Effects of Block Trades in the Corporate Bond Market

In this section, we describe our methodology to measure the price effects surrounding the block transaction. We classify price effects as permanent and temporary, then further decompose temporary effects into dealer and receiver spread components.

4.1. Measuring Price Effects of Block Trades

Figure 3 Panel A provides a graphical representation of the price effects of a customer-initiated block buy. Following the block trade literature (Kraus and Stoll, 1972), we calculate the block initiator's trading cost for trade size Q, I(Q), by comparing the block trade price P_B at block trade time t_{block} to the

bond's pre-trade benchmark price, which we define as the value weighted-average trade price (VWAP) (across all dealers) during the prior week (P_{-1}), relative to the week of the block trade. In Equation (1), the variable D equals +1 for a customer-initiated block buy and equals -1 for a customer-initiated block sell.

$$\textit{Block initiator cost, } I(Q) = D * [Ln(P_B) - Ln(P_{-1})] * 100 \qquad (1)$$

In the literature, the liquidity effect of the block trade is temporary while the information effect is permanent. A block trade causes the dealers' inventory to depart from the desired level (see Stoll, 1978; Amihud and Mendelson, 1980). In the case of a customer block buy, the initiator pays a premium in the form of a higher block price to compensate the dealer for added inventory risk. The temporary price impact T(Q), which captures the price pressure of the trade, is measured by the magnitude of reversal in the bond price after the block trade. We empirically estimate T(Q) by comparing the block trade price P_B to the bond's weekly VWAP in the following week (P_{+1}). The permanent price impact, P(Q), reflects the change in the market's perception of the fundamental bond value following the block trade, estimated by comparing the bond's weekly VWAP in the following week (P_{+1}) to the bond's weekly VWAP in the prior week (P_{-1}).

$$\textit{Temporary price impact, } T(Q) = D * [Ln(P_B) - Ln(P_{+1})] * 100 \qquad (2)$$

$$\textit{Permanent price impact, } P(Q) = D * [Ln(P_{+1}) - Ln(P_{-1})] * 100 \qquad (3)$$

We exploit the detailed enhanced TRACE data to delineate temporary price impact into compensation for the block dealer and receivers. This reflects that, in settings where dealers face significant inventory risk, such as illiquid bonds, block trades, or periods of market stress, receivers could potentially earn a portion of the liquidity premium by offsetting the dealers' position. To calculate dealer spread, we compare the prices of the dealer's round trip, i.e., the price P_B at which the dealer participates in the block trade, and the VWAP of receiver trades P_{OFF} at which the dealer offsets the block position. To calculate receiver spread, we compare the bond's weekly VWAP following the block week (P_{+1}) with the VWAP of receiver trades P_{OFF}.

$$\textit{Dealer spread, } D(Q) = D * [Ln(P_B) - Ln(P_{OFF})] * 100 \qquad (4)$$

$$\textit{Receiver spread, } R(Q) = D * [Ln(P_{OFF}) - Ln(P_{+1})] * 100 \qquad (5)$$

In Figure 3, Panel A, the illustration shows the initiator cost of 20 bp for a customer block buy that is decomposed into permanent (5 bp) and temporary (15 bp) price impact, and further in Panel B, into dealer spread (10 bp) and receiver spread (5 bp).

To facilitate comparison across trading cost measures, the sample of 205,104 block trades that we identify in Table I, Panel B have non-missing values of initiator costs, dealer spreads and receiver spreads. That is, the bond must have at least one trade during the prior week, at least one trade during the subsequent week, and at least one (offsetting) trade by the block dealer during the block week.[16] We exclude blocks with initiator cost, dealer or receiver spread, or dollar permanent price impact that exceed $50 (which are highly likely to reflect errors), those identified as "agency" or prearranged trades and those with a block trade price below $5.[17] Trading costs are winsorized at the 1% and 99% levels.

4.2. The Price Effects of Block Trades

Table III presents the trading costs for our sample. Panel A reports the block initiator costs. For blocks of at least $15 million, block initiator costs average about 18 bp over our sample period. With about 10,500 block trades each year and the average block size of about $23 million, trading costs for our sample aggregate to about $435 million annually. Trading costs of the mega-block sample (21 bp) are higher than those of the $15-$20 million blocks (16 bp), consistent with inventory and information models, but notably, this result stands in sharp contrast to the literature's findings that trading costs decline with trade size in the broader TRACE data (see e.g., Edwards et al., 2007). Panel D reports that block initiator costs are larger for high yield bonds (22 bp) than investment grade bonds (16 bp).

Panels B presents a two-way decomposition of initiator costs into permanent and temporary price

[16] The requirement of non-missing initiator cost, dealer and receiver spread, and permanent price impact removes 20% of the sample. The vast majority of excluded blocks lack an offsetting trade during the block week. Admittedly, dealers' unwillingness or inability to offset the block within a week may not be random. We find that these excluded blocks may be more difficult for the dealer to place—excluded blocks are marginally larger (by $700,000 on average), are more likely to be buy trades (we show in Section 6 that buy trades are more likely to be associated with adverse selection) and are more likely to be intermediated by a small dealer. However, we also find that excluded blocks are less likely to be the riskier high yield bonds, consistent with Goldstein and Hotchkiss (2020) who show that dealers are more likely to quickly offset inventory resulting from trades in high yield bonds.

[17] The requirement that spread measures do not cross $50 removes 0.02% of the sample and the requirement of non-agency and non-prearranged trades removes an additional 12% of the sample. Our final sample consists of 205,104 block trades.

impact. For the full sample, the mean and median permanent price impact is economically small. Although average and median permanent price impact is near zero, the 66th, 75th and 90th percentile of permanent price impact are 25 bp, 52 bp and 162 bp respectively, indicating that many blocks are associated with large information effects. In contrast to the equity block literature, which finds that information effects increase with block size (e.g., Madhavan and Cheng, 1997), information effects in corporate bonds do not vary systematically with block size. For blocks of at least $15 million, temporary price impact is economically large, averaging 18 bp, and increases with block size, from 16 bp for small blocks to 23 bp for mega-blocks, and almost twice as large for high yield (32 bp) than investment grade (13 bp) bonds.

Panel C presents a three-way decomposition of initiator costs into permanent price impact, dealer spreads, and receiver spreads. The temporary price impact, which represents compensation for liquidity provision, is entirely captured by the dealer. In fact, dealer spreads of 22 bp in Panel C are larger than the temporary price impact of 18 bp in Panel B. Dealer spreads do not vary with block size and are larger for high yield bonds (31 bp) than investment grade (18 bp) bonds.

Taken together, it is noteworthy that receivers often earn *negative* spreads, implying that they do not get compensated for providing liquidity services to the dealer. For the full sample, receiver spreads average about -3 bp (Panel C), are larger for high yield (1 bp) than investment grade (-5 bp) bonds, and increase with block size, from -6 bp for smaller blocks to zero markup for mega blocks.[18] In Appendix Table III, we show that receiver spreads vary with counterparty type—spreads are close to zero when the receiver is a large dealer, while negative when the receiver is a customer or a small dealer.

5. The Economics of Receiving Investor Participation

Given that dealers have limited risk bearing capacity, particularly after banking regulations, a reasonable explanation is that receivers should earn compensation for reversing the dealers' block position (see e.g., Anand et al., 2021; Choi et al., 2023). However, our results suggest that receivers, despite being

[18] In Appendix Table IV, we study the determinants of the price effects of block trades using a panel regression. The dependent variable in the regressions are initiator costs and the associated component price effects from Table 3. The explanatory variables are the important bond attributes, market conditions and block size. Consistent with the literature on corporate bond transactions costs, initiator costs and liquidity effects of the block are positively associated with block size, bond age, and high yield bonds, and negatively associated with issue size. Regression coefficients on bond attributes have a similar sign in the dealer spreads and receiver spreads regressions.

institutions, pay a markup for participating in offsetting trades. In this section, we study the economics underlying the receiver's participation in the block market.

Burdett and O'Hara's (1987) model offers a rational explanation for receiver participation, namely that investors who desire to either establish or liquidate a position might incur a higher trade execution cost for initiating a similar-size trade. To test the model's prediction, we build a trading cost model using our sample of block trades and then impute the cost of initiating a hypothetical trade on the block date. Specifically, the dependent variable of the trading cost model is the block initiator cost, and the explanatory variables are trade attributes, bond characteristics and market conditions at the time of the block trade.[19] The trading cost model is reported in Appendix Table IV Column 1. For each block trade, we estimate the "*imputed initiator cost*" as the fitted value from the model, where the trade size is the weighted average size of receiver trades associated with the block trade.[20]

In Table IV Panel A, we report the *receiver spread*, the *imputed initiator cost* from the trading cost model (multiplied by -1 for comparison purposes) and the *receiver savings*, which is the (pairwise) difference between the two measures. For the full sample, *receiver spread* averages -3 bp and mirror those reported in Table III, while the *imputed initiator cost* averages -14 bp. Thus, *savings* to receivers for participating in offsetting trades versus initiating a similar size trade are both economically (10 bp) large and statistically significant. *Savings* for receivers are positive for investment grade (Panel B) and high yield bonds (Panel C), averaging 7 bp and 19 bp, respectively, and greater for mega-blocks (16 bp), particularly in high yield bonds (32 bp). Further, savings increase monotonically with the number of offsetting trades, from 7 bp when the block is associated with one or two offsetting trades to 22 bp when the block is

[19] The dependent variables include the log of block size, age and issue size, and indicators for high yield, financial sector, on-the-run, 144A bonds, and blocks intermediated by small dealers, and the weekly corporate bond market index return, the trailing weekly S&P index return, the average three-month LIBOR interest rate, and the level of the VIX index over the preceding five days. The corporate bond index return is measured around the time of the offsetting trades rather than the time of the triggering block trade.

[20] Admittedly, the trading cost model is based on block trades of at least $15 million while the average receiver trade size is less than $15 million. However, we note that our imputed cost estimates likely understate the trade execution cost, as it is well known that trading costs decline with trade size in the corporate bond market (see, e.g., Edwards et al., 2007). Bessembinder et al. (2018) report that transaction costs are 0.25% for trades between $100,000 and $1 million, 0.19% for trades between $1 and $10 million, and 0.16% for trades that exceed $10 million. We do not estimate the trading cost model using smaller trade size definitions as classification of trades as initiator versus receiver customer type becomes more difficult for non-block sized trades.

associated with 10 or more offsetting trades (Panel D). These results suggest that receivers obtain better trade terms when block attributes improve their negotiating power with dealers, such as when the block is larger or involves riskier bonds (i.e., scenarios where dealers face higher inventory risk). Overall, the results indicate that investors who desire to either establish or liquidate a position are better off participating as a receiving investor than an initiating investor.

6. Adverse Selection and Receiving Investor Outcomes

The block market is a setting where asymmetric information is elevated, as large trades are often information motivated. In support of the Burdett and O'Hara (1987) prediction, our results thus far suggest that, although receivers pay a markup on offsetting trades, participation is still optimal, as their savings are positive versus initiating a similar-size trade. In this section, we examine scenarios where adverse selection risk within the block trade process is particularly elevated. We consider both ex-post and ex-ante adverse selection risk.

6.1. Ex-Post Adverse Selection

In Figure 4, we sort each block trade (based on our full sample of 205,104 block trades) into permanent price impact deciles, then we report the average receiver spread for each decile. We find a clear negative relation between permanent price impact, a well-accepted measure of ex-post adverse selection risk (see Kraus and Stoll, 1972), and receiver spreads. For block trades in Decile 1 (i.e., lowest permanent price impact), receivers earn large positive spreads; for Decile 5, receiver spreads are essentially zero; and for Decile 10, receivers earn large negative spreads. In comparison, dealers earn large positive spreads for Decile 1, but notably, dealer spreads are stable at about 10 bp from Decile 5 to Decile 10. These results suggest that dealers typically anticipate informed blocks and pass adverse selection costs to less informed counterparties (i.e., receivers).

6.2. Ex-Ante Adverse Selection

In our second setting, we exploit evidence from prior studies about asymmetric information effects of sustained buying versus selling activity in the corporate bond market (Cai et al., 2019; Anand et al., 2021). These studies find that block buys appear to be information motivated, while block sells are not.

Along similar lines, equity block market studies report higher permanent price impact for block buys than block sells (Kraus and Stoll, 1972; Keim and Madhavan, 1996). These empirical patterns are in line with theoretical predictions (e.g., Burdett and O'Hara, 1987; Keim and Madhavan, 1996) that a block buy, where the initiator chooses to build a position in a specific security, is more likely to be motivated by private information than a block sell, where initiator could potentially be selling an existing position in response to a liquidity shock.

Table V reports cost measures analogous to those in Tables III for block buys and sells. For the full sample, there are 130,109 sell blocks and 74,995 buy blocks. Panel A reports that, consistent with the literature, permanent price impact is positive and substantially higher for block buys (7 bp) than block sells (-4 bp). Nonetheless, initiator costs are lower for block buys (15 bp) than block sells (19 bp). Dealer spreads are positive and of similar magnitude for both block buys (23 bp) and sells (21 bp). This implies that the higher adverse selection costs of block buys is borne primarily by receivers. For block buys, receivers earn negative spreads (-12 bp), while for block sells, which do not have information effects, receiver spreads are slightly positive (1 bp).

Following the approach described in Section 5 and Table IV, we calculate imputed initiator costs for block buys and sells.[21] Table V Panel B reports the *Savings* for receiving investors, calculated as the pairwise difference between receiver spread and imputed initiator cost. For block sells, where information effects are small, *Savings* are large and average 20 bp. Thus, investors who desire to build a position are better off participating as receivers in the block market.

For block buys, where adverse selection costs are high, *Savings* is on average slightly positive (1 bp), which reflects receiver spread of -12 bp and imputed initiator costs of -13 bp. Thus, the losses attributable to higher adverse selection borne by receivers in offsetting trades are nearly offset by the liquidity premium that is avoided by not participating as initiator. These patterns support Burdett and

[21] Our methodology is similar except for one detail - we estimate the regression model in Appendix Table V Column (5) of block initiator costs on bond and market controls for block buys, then use the parameter estimates from this model to obtain imputed initiator costs for the receiver trades associated with block sells. Similarly, the imputed initiator costs for the receiver trades associated with block buys is based on the model in Appendix Table V Column (10).

O'Hara's (1987) theoretical prediction that receivers lose money on informed blocks, but despite such losses, participation can be optimal.

Our results highlight the conditions that can adversely affect a well-functioning block market, namely that when adverse selection costs are excessively high, participating as a receiver results in less favorable outcomes than initiating a similar-size trade. For example, in Table V Panel B, for receivers participating in block buys between $15 and $20 million, the receiver spread of -15 bp exceeds the imputed initiator cost of 13 bp. This is because smaller block buys in our sample have the highest information effects. The negative savings could potentially shrink the pool of counterparties available to the dealer.

We note that receivers can obtain implicit benefits of participation even if the explicit savings on receiver trades are negative. Notably, even if not profitable on a per-trade basis, participating as a receiver may lower overall trading costs for the institution, as it helps build a relationship with the dealer. Existing studies document lower trading costs for relationship clients (Hendershott et al., 2020b; O'Hara et al., 2018; Nikolova and Wang, 2020; Goldstein et al., 2021, Jurkatis et al., 2022)).

7. Disclosure of Trading Information and Receiving Investors Outcomes

The results thus far suggest that being a counterparty to a block dealer is an optimal strategy for investors interested in building or reducing a large position. One driver of receiver outcomes is the trading environment, which potentially confers information advantages on dealers over receivers during bilateral negotiations. In this section, we study the impact of the trade disclosure regulation on the block market participants. During our sample period, the corporate bond market was subject to numerous regimes of trade reporting rules, which generally led to greater transparency but also controversy, as many industry groups have opposed proposals that advocate for timely reporting of block trades.

7.1. Introduction of Mandatory Trade Reporting

We study the introduction of mandatory post-trade reporting in corporate bonds. Transparency was introduced in stages beginning with trade report initiation for a small group of actively traded bonds in July 2002. In this analysis, we study the sample of public bonds with staggered trade reporting in 2003, 2004, and 2005 and the sample of non-public 144A bonds in 2014. The dissemination dates for the 2003, 2004,

2005, and 144A sample of bonds are March 3, 2003, October 1, 2004, February 7, 2005 and June 27, 2014, respectively. For bonds with TRACE initiation in March 2003, the period before transparency is restricted to 8 months, as the TRACE system was implemented in July 2002. We therefore select the period after transparency to be 8-months, and to stay consistent, select a 16-month window for all four samples.

For each sample, we study a 16-month period before and after the initiation of trade reporting.[22] For a bond to be included in our sample, the bond must have at least one block trade in the period before and after transparency. We retain block trades that are not marked as agency trades, not identified as pre-arranged by our algorithm, have a block trade price of at least $5.00 and have non-missing trading cost measures. These filters yield 622 block trades in 132 issues for the 2003 sample, 863 block trades in 192 issues for the 2004 sample, 47 block trades in 9 issues for the 2005 sample, and 912 block trades in 183 issues for the 2014 sample.

Table VI reports the results of the impact of mandatory trade reporting on block initiator costs, dealer spreads, and receiver spreads for our combined sample of block trades. Panel A reports univariate analysis of trading costs before and after TRACE initiation while Panel B reports similar analyses in a multivariate setting. *Post-Transparency* is an indicator variable that equals one for block trades in the period after trade report initiation and equals zero otherwise. Regressions include issue fixed effects, trade-level controls (the natural log of trade size, whether the intermediary is a small dealer) and market controls (the trailing weekly corporate bond market index return, trailing weekly S&P index return, the change in the average three-month LIBOR interest rate, and the change in the VIX index over the previous week) and standard errors are clustered at the issue level. We report dependent variable averages above the regression results and *p*-values below the regression coefficients.

Theoretical models (e.g., Pagano and Roell, 1996; Green et al., 2007) predict that opaque markets create opportunities for dealers to exploit their information advantage over customers. The univariate results

[22] Specifically, for bonds with TRACE initiation in March 2003, we study the 16-month period between July 2002 (when TRACE was implemented) and October 2003 and define the period on or after March 2003 as post-TRACE. For bonds with TRACE initiation in October 2004, we study the 16-month period between February 2004 and May 2005, and define the period on or after October 2004 as post-TRACE. For bonds with TRACE initiation in February 2005, we study the 16-month period between June 2004 and September 2005, and define the period on or after February 2005 as post-TRACE. For 144A bonds with TRACE initiation in June 2014, we study 16-month period between November 2013 and February 2015, and define the period on or after June 2014 as post-TRACE.

in Table VI Panel A suggest that dealer spreads for facilitating blocks decline after mandatory trade reporting, from 23 bp to 18 bp, while regression results in Panel B, column (3) point to an 8 bp reduction in dealer spreads. In both panels, the decline is statistically significant and economically large, as 8 bp reflects about a third of the dealer spreads (23 bp) before trade reporting was introduced.

For block initiators, trade execution costs in Panel A, column (1) are not statistically different before and after trade reporting is introduced, averaging about 19 bp, and in Panel B, column (1), the coefficient on *post-Transparency* is not statistically significant. Therefore, greater transparency, despite reducing dealer spreads, had no impact on trade execution costs for one type of block market customer: the initiator.

We find that receivers are the primary beneficiaries from trade report initiation in the block market. Receiver spreads increase, as reported in Panel A, column (5), from a -10 bp before trade reporting to -2 bps after trade reporting. The regression coefficient in Panel B, column (5), points to a statistically significant increase at the 10% level in the multivariate analysis. The increase of 11 bp is economically large relative to receiver spreads of -10 bps before transparency.

Prior studies examining the corporate bond market have broadly concluded that trade report initiation led to a reduction in dealer spreads and improvements in trade execution costs for customers.[23] Our study contributes to this literature by adding nuance to existing evidence. In the setting of the block market, we show that the impact of trade report initiation varies among customers depending on the extent of information disadvantage during bilateral negotiations with the block dealer. Consistent with theory, such as Madhavan (1995), mandatory trade reporting primarily benefits less-informed customers (i.e., receivers), while its effects on better-informed customers (i.e., initiators) remain relatively unchanged.

We further investigate whether dealers, in response to reduced spreads after trade report initiation, withdraw from facilitating block trades. In both univariate and multivariate tests (See Appendix Table VI), we find that block volume relative to total volume does not decline; [24] however, with mandated trade

[23] See, e.g., Edwards et al. (2007), Bessembinder et al. (2006), Goldstein et al. (2007), and O'Hara et al. (2018).

[24] The analysis in Appendix Table VI is based on block activity during a cusip-week average. The control variables in Panel B, column (1) regression are the trailing weekly S&P index and the change in average three-month LIBOR interest rate and VIX index over the previous week. The model is estimated with issue fixed effects and standard errors clustered at issue level. Columns (2)-(4) include additional controls - the natural log of trade size, bond age, indicators for on-the-run bonds and block trades intermediated by small dealers, the trailing weekly corporate bond market index return, trailing weekly S&P index return.

reporting, dealers do offset a larger portion of the block within the block week and are more likely to fully offset the block position. Thus, we find that dealers continue to intermediate blocks but appear more sensitive to added inventory risk of the block position, leading them to speed up the offsetting activity, which likely helps improve the trade terms for receivers.

7.2. Within Block Analysis: Dispersion in Receiver Spreads

In Figure 5, we examine whether, for a block trade, terms vary with the receiver's position within a sequence of offsetting trades. This analysis could provide insights into whether specific strategies result in more favorable terms for receiving investors. We examine 148,601 block trades of at least $15 million that are associated with two or more receiver trades. Using trade execution timestamp for the full sample of block trades, we calculate the average receiver spreads for the first, second, third, fourth, and "fifth and higher" offsetting trades within a block. Figure 5 shows that receiver trades earlier in sequence earn negative spreads while those later in sequence earn positive spreads. These patterns support the explanation that we will explore in the next section—namely that receiver spreads are affected by the timing of the public disclosure of the block trade.[25]

7.3. Within Block Analysis: Trade Reporting Delay and Receiving Investor Spreads

As per regulatory rules, FINRA-registered dealers are required to report all completed corporate bond trades (customers do not report trades) to FINRA's TRACE system, which disseminates the trade information, including price and size, immediately upon receipt of a trade report from a dealer to the market.[26] Notably, FINRA stipulates a maximum permissible delay between the execution of the trade and the reporting of the trade to FINRA's TRACE system. In the context of the block market, the reporting delay allows the dealer to benefit from information about trade motive (partially) observed during bilateral

[25] This pattern also supports the Keim and Madhavan (1996) prediction that the dealer will first offset the block position with the most interested receivers who are more likely to accept worse terms of trade. However, we do not observe as strong of a pattern when examining block trades that occurred prior to the introduction of public reporting, indicating that the disclosure of the block trade is an important explanation for the observed pattern in Figure 5.

[26] FINRA currently applies dissemination caps to large-size trades in corporate bonds. Reports for trades at or below the dissemination caps includes both the price and trade size while reports for trades above the dissemination caps include the price and capped trade size ("5MM+" (for IG) and "1MM+" (for non-IG)). The uncapped trade size is later published as part of a historical dataset six months after the calendar quarter in which they are reported. Hollifield et al. (2020) conclude that reporting caps are not particularly important in the presence of price reports.

negotiations with the initiator, and to potentially offset a portion of the block at an advantageous price with receivers before the block is publicly reported. Back et al. (2020) predicts that receiving investors obtain better terms on offsetting trades that occur after versus before the report of a block trade.

In this section, we study the impact of the rules pertaining to maximum stipulated time delay in reporting trades to the TRACE system. During our sample period, FINRA shortened the reporting delay in three stages, from 75 minutes to 45 minutes, to 30 minutes, to the current 15 minutes. We examine block trades during these four reporting regimes: July 2002-September 2003 when trades were required to be reported within 75 minutes; October 2003-September 2004 when trades were required to be reported within 45 minutes; October 2004-June 2005 when trades were required to be reported within 30 minutes; and July 2005-June 2006 when trades were required to be reported within 15 minutes.

For this analysis, we start with our original sample of 205,104 block trades, then exclude block trades for bonds that were not yet eligible in each regime for TRACE-dissemination and further, those reported more than 24 hours after the execution timestamp of the trade (these are likely errors). We retain block trades with at least one receiver trade both before and after the block trade report timestamp.[27]

For each reporting regime, we calculate separately the cost measures for receiver trades with an execution timestamp that occurs before and after the report timestamp of the block trade. Dealer and receiver spreads are calculated using trade-size weighted average prices, resulting in two observations for each block trade. This setting allows a control for the impact of trade-specific, bond-specific, and market-wide factors on the spread measures.[28]

The results are reported in Table VII Panel A. We observe that receivers obtain better terms on offsetting trades that occur after relative to those before the report of the block trade. Specifically, in the July 2002-September 2003 regime, receivers lose 16 bp on offsetting trades that occur prior to block trade

[27] After removing bonds that are not TRACE eligible, we have 184,498 block trades over the sample period 2002-2021. Of this sample, 109,826 (59.4%) do not have an offsetting trade before block trade report and 18,034 (10%) do not have an offsetting trade after block trade report. Appendix Table VII presents the results analogous to Table VII Panel A without imposing the filter of a trade both before and after the block trade report. We find the results are qualitatively similar to Table VII.

[28] FINRA initiated TRACE reporting for some corporate bonds in October 2003, when maximum stipulated delay was reduced from 75 minutes to 45 minutes. The overlap does not affect the trade report delay analysis, which uses a within-block setting for the sample of transparent bonds; however, the overlap could potentially impact the mandatory trade reporting analysis discussed in Section 7.1.

report but lose only 7 bp on offsetting trades that occur after block trade report, an improvement in trade terms of about 50%. These improvements can be observed for receiver spreads across all reporting regimes and range from 5 bp to 11 bp. The patterns in dealer spreads mirror those observed for receiver spreads, yet with an opposite sign. For example, in the July 2002-September 2003 regime reported in column (1), dealer spreads decline from 30 bp to 22 bps.

Table VII Panel B reports on the impact of block trade report on dealer and receiver spreads in a multivariate setting. Like the univariate analyses, we study within-block differences in spread measures using receiver trades that execute before and after the report of block trade. 'Trades after report' is an indicator variable that equals one for receiver trades after block trade report and equals zero otherwise. All regressions are estimated using block-level fixed effects, and in columns (2) and (4), we include controls for the average offsetting trade size and the percentage of offsetting trades with a customer before and after the block trade report. We report dependent variable averages at the top of the regression and *p*-values below coefficients.

Results in Panel B column (1) suggest that dealer spreads, on average, are reduced by 7.4 bp on offsetting trades that occur after versus before block trade report. Dealer spreads average 20 bp for this sample of block trades, implying that the reduction is economically large. The results in column (3) suggest that receivers obtain better terms when they participate in offsetting trades that occur after the report of the block trade. Receiver spreads average -6 bp for our sample of block trades, implying the reduction of 7.4 bp is economically large.

Our analyses offer empirical support for the primary mechanism envisioned in theoretical models on how greater transparency levels the information playing field. In these models, receivers are informationally disadvantaged during bilateral negotiations with the dealer. Timely reporting of the block trade allows receivers to whom the dealer distributes the block to account for the potential adverse price move of a block trade.

7.4. Reporting Delay Regimes and Dealer Behavior

The results thus far show that dealers earn smaller spreads on offsetting trades that occur after the report of the block trade. In this section, we study how dealers change their trading behavior as reporting

delay declines during the four regimes. The sample in Table VIII is constructed based on the screens described for Table VII with one exception--we do not require an offsetting trade in both the period prior to and after the block trade report. Panel A reports statistics on compliance with the reporting rule. In the July 2002-September 2003 regime, 92% of trades are reported within the stipulated maximum delay of 75 minutes, but only 70% are reported within 15 minutes. As the stipulated maximum delay drops over time to 15 minutes, 90% of trades are reported within the stipulated period. Thus, dealers respond to changes in reporting rules with trade reports that are less delayed, as intended by regulators.

Dealers are strategic about the speed with which they offset the block position. In all four reporting regimes, dealer offsets about 20% of the block position before block trade report. In other words, as stipulated maximum reporting delay for the block trade declines from 75 minutes to 15 minutes, dealers offset the block position at a faster rate, potentially to obtain better terms on receiver trades before the block trade is made public. Within the block week, dealers offset about half the block position and about 30% of blocks are fully offset in all four regimes.

Panel B reports results of dealer behavior in a multivariate setting. The indicator variables capture whether the block trade occurred during the 45-minute, 30-minute, or 15-minute reporting regime. The 75-minute regime serves as the reference period in the regressions. Regressions are estimated over the July 2002-June 2006 period.[29] Column (1) shows no material reduction in block activity following the shift from 75 to 45-minute and from 45 to 30-minute, and a reduction of 0.4 (about 12%) from 30 to 15-minute reporting regime. Results in columns (2) and (3) suggest that reductions in maximum stipulated reporting delay do not significantly change dealers offsetting behavior over the window of a block week. Importantly, in column (4), the coefficient on *% Offset Volume Before Report* is not statistically different across the regimes even though, as seen in Panel A, the average block trade reporting delay declines from 25 minutes in the July 2002-September 2003 regime to 14 minutes in the July 2005-June 2006 regime. Together, these

[29] Regressions include trade-level (except the regression in Column (1)) and issue-level (the natural log of trade size, bond age, issue size, and indicators for bonds issued by financial firms, on-the-run bonds, and block trades intermediated by small dealers) and market controls (the trailing weekly corporate bond market index return, trailing weekly S&P index return, the average three-month LIBOR interest rate, and the VIX index over the previous week) and are estimated using robust standard errors. Regressions in Column (1) are based on cusip-week trading activity and do not include trade-level or small dealer controls.

results suggest that dealers strategically speed up the offset activity of the block position as the reporting delay shortens in three stages.

7.5. Is Late Reporting Strategic?

The results thus far indicate that roughly 10% of the block trades in each reporting regime are not compliant with the reporting rule. If non-compliance (i.e., report "late") is strategic, i.e., to withhold valuable information that benefits the dealer in bilateral negotiations with receivers, then it should be observed more often for larger blocks. On the other hand, non-compliance due to other (e.g., back-office staffing, or slow systems) reasons should have no relation to block size.

In Table VIII Panel A, we report the non-compliance statistics by block size during the four reporting regimes. For blocks of at least $15 million, a material 8-10% of blocks in all four regimes are not in compliance with reporting rules while for mega blocks of at least $30 million, the non-compliance rate is 10% to 13%. For comparability, we examine non-compliance for all TRACE trades, including the very smallest trades, and find only 4-7% are reported outside of stipulated maximum delay. Porter and Weaver (1998) use out-of-sequence equity market NASDAQ trades to identify late reporting, arguing that dealers strategically delay reporting of equity trades that are information motivated. Our results suggest that non-compliance appears more often for mega blocks where benefits to the dealer are potentially larger.

Dealers may also strategically report within the stipulated time but not immediately (i.e., report "slow"). Appendix Figure 2.A shows a histogram of block trades that are reported within 0-1 minutes, 2-14, 15-29, etc. for the four reporting regimes. A large majority of blocks are reported immediately (within 1 minute), but still many blocks are reported with a longer delay. For the 75-minute regime, 30% of blocks are reported with a delay of 15 minutes or longer; for the 15-minute regime, 38% of blocks are reported with a delay of two minutes or longer.

In Table IX, we provide evidence that those blocks with longer reporting delay are typically "more difficult" blocks. We compare "fast" reports (i.e., reported within two minutes of execution) to "slow" reports (i.e., reported within the last five minutes of stipulated time) and "late" reports (i.e., outside regulation). Table IX shows that relative to fast reports, slow and late reports tend to be associated with larger block sizes, mega blocks, and block buys (i.e., higher adverse selection). Smaller dealers, who likely

have more difficulty placing the bonds, are significantly more likely to delay trade reporting. We also find that blocks associated with slow or late reports have a higher percentage of the block position that is offset, which points to the benefits of delayed reporting to the dealer.

8. Conclusions and Implications

We highlight the important role of receiving investors in the corporate bond block market. We test theoretical predictions about how the information environment affects receivers, a topic that has received less attention in the literature. Our analysis is based on a comprehensive sample of 205,104 block trades and 690,418 receiver trades in corporate bonds over the period 2002 to 2021. We find that receivers, the least informed party within the block trade process, primarily bear the adverse selection costs whereas dealers, who observe the identity of the block initiator and the terms of the block trade, are able to anticipate informed trading and manage adverse selection risk.

Despite being institutions that offset the dealers' block position, receivers do not obtain a portion of the liquidity effects associated with the block trade. So why do they participate? We show that participation represents a reasonable strategy, as receiver costs are either substantially lower (for building a position) or roughly equivalent (for liquidation a position) to the costs of initiating a similar-size trade. These findings offer direct empirical support for the Burdett and O'Hara (1987) model and demonstrate the block market's appeal to investors seeking to establish or liquidate a large position. An important implication is that regulations that increase asymmetric information will adversely impact the health of the block market.

We exploit regulatory changes over a two-decade period governing the disclosure of trading information. This includes the introduction of TRACE trade reporting and the changes to the maximum permissible delay between trade execution and reporting by the dealer. Both analyses show that receiver losses are tapered in trading environments with greater post-trade transparency—receivers are better able to anticipate information effects and manage the adverse selection costs when the block trade report is timelier. Our results offer empirical support for the specific mechanism proposed by theorists, showing that

trade disclosure partially reveals the dealer's private information, thereby reducing the dealer's ability to extract profits from receivers.

Despite the broader movement toward greater transparency in fixed income markets, regulators have considered proposals in recent years to delay the reporting of block trades in the corporate bond and swap markets. In June 2019, FINRA proposed a pilot program to delay the report of a corporate bond block trade from 15 minutes to 48 hours, following the recommendation put forth by SEC's Fixed Income Market Structure Advisory Committee (FIMSAC). Much of the regulatory discussion has focused on the potential benefits of delayed trade reporting for block initiators and dealers. Proponents argue that delayed block reporting provides dealers with more time to offset positions and thereby initiators may receive better trade terms from dealers in the block market.

Our study provides relevant evidence on the economic factors that explain the widespread support for the proposal from the dealer community.[30] Our analyses indicate that extending the delay for block trades will increase dealers' spreads and have a clear detrimental impact on receiving investors in the block market. We also show that block market activity remains stable even as transparency increases over our sample period, implying that dealers do not withdraw from the market. Instead, dealers offset the block position at a faster rate when trade reporting is timelier.

We also provide guidance on a new SEC proposal to reduce the maximum stipulated trade reporting delay from current 15-minutes to no later than one minute after trade execution in various fixed income markets. We find that dealer behavior during 2021 closely resembles the behavior during the regime from July 2005 to June 2006, both of which operated under a 15-minute reporting requirement.[31,32] Our results suggest that implementing the one-minute delay proposal will provide receivers with timely, value-relevant

[30] See SIFMA's comment letter on the proposed pilot: https://www.finra.org/sites/default/files/2019-06/19-12_Sifma_Comment.pdf

[31] Specifically, in Table VIII, the average reporting delay is 14.6 minutes vs. 13.7 minutes; the percentage of block trades that are in reporting compliance is 93% vs. 90%; the percentage of block volume offset within the block week is 64% vs. 54%; the percentage of block trades that are fully offset within the block week is 40% vs. 34%; and the percentage of block volume offset before the block trade is publicly reported is 20% for both periods. In column (5) of Table VII, we report that, in 2021, dealer spreads decline by 2 bp and receiver spreads increase by 2 bp for offsetting trades that occur after relative to before the report of the block trade.

[32] Appendix Figure 2.B illustrates a histogram of the distribution of block trade reporting delays in 2021. It shows that 62% of blocks were reported immediately, while the remaining 38% had delays of two minutes or more, similar to the distribution from July 2005 to June 2006.

information during the bilateral negotiations with dealers. However, we also document, across all reporting regimes, a consistent preference among dealers, possibly due to inventory risk considerations, to offset around 20% of the block position before the block trade is reported. Additionally, smaller dealers are significantly more likely than larger dealers to report block trades with longer delay. Therefore, regulators must further examine whether one-minute reporting allows sufficient time for dealers, especially smaller ones, to effectively manage block positions, and if not, whether it may adversely affect the dealers' willingness to intermediate blocks in a principal capacity. Our results on benefits of timely trade disclosures are relevant for recent regulatory efforts concerning the disclosure of aggregate trading volume data of U.S. Treasury securities and OTC U.S. equity markets.

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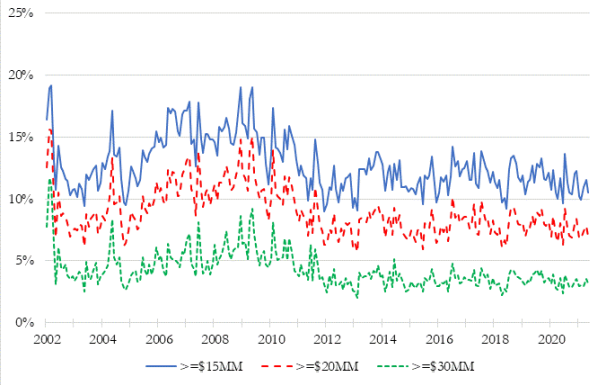
Figure 1

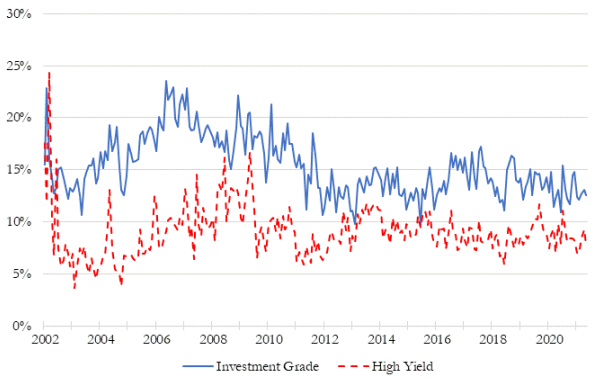
Block Trading Activity 2002-2021

These figures show block trading statistics over the July 2002 to November 2021 sample period. Figure A shows block trading volume relative to total volume for blocks that exceed $15 million (blue solid), $20 million (long red dash), and $30 million (short green dash). Figure B shows block trading volume (>=$15 million) relative to total volume for investment grade (blue solid) and high yield (long red dash) bonds. Figure C shows the percentage of block trades that are prearranged, defined as blocks that are offset in a single trade within 15 minutes.

A. Block Size



B. Investment Grade vs. High Yield



C. % of Block Trades Prearranged

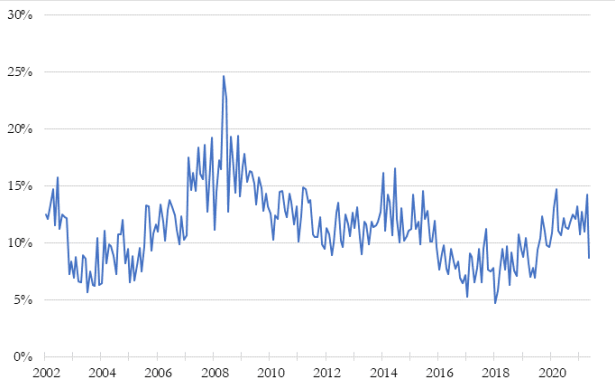
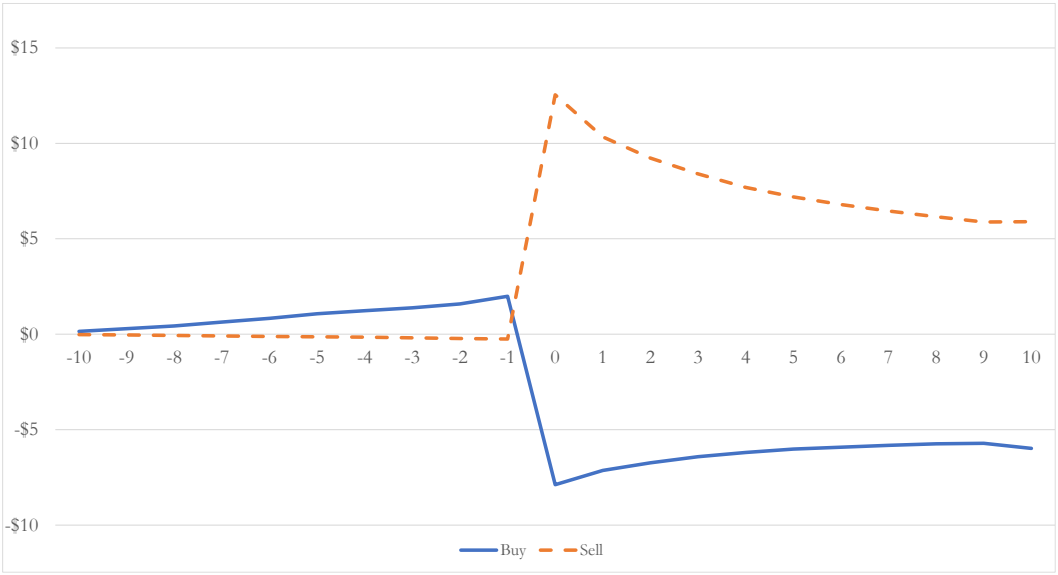


Figure 2

Dealer Inventory Surrounding the Block Trades

This figure reports the mean and median signed end-of-day cumulated intermediating dealer inventory in the block bond starting ten days prior to the triggering block (time 0) and ending ten days subsequent (day 10). The analysis is based on the sample of 205,104 reported in Table 1. Orange dash lines represent customer block sells and blue solid lines represent customer block buys.

Mean signed end-of-day cumulated intermediating dealer inventory



Median signed end-of-day cumulated intermediating dealer inventory

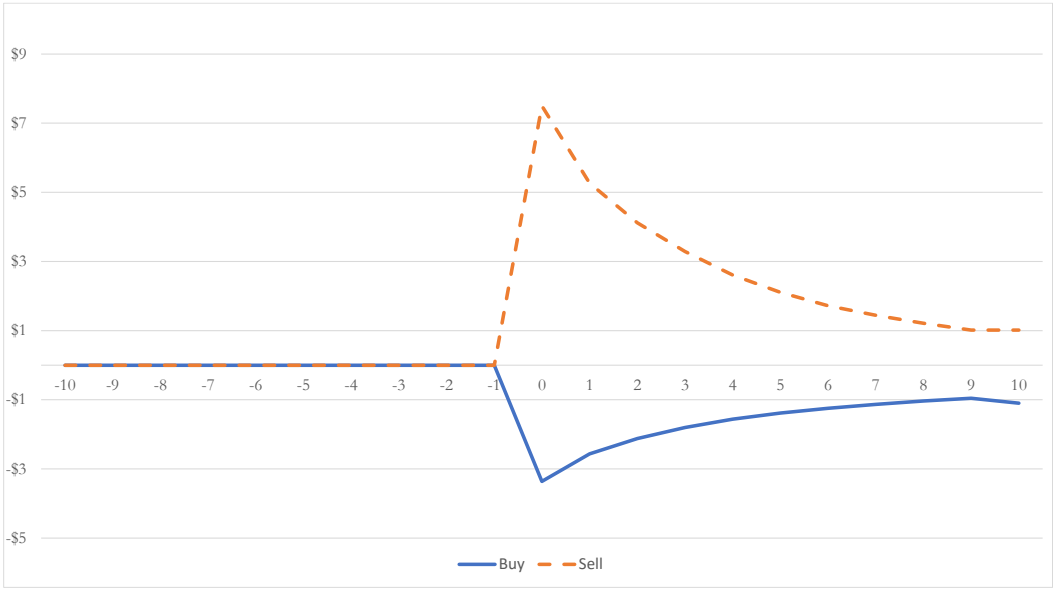
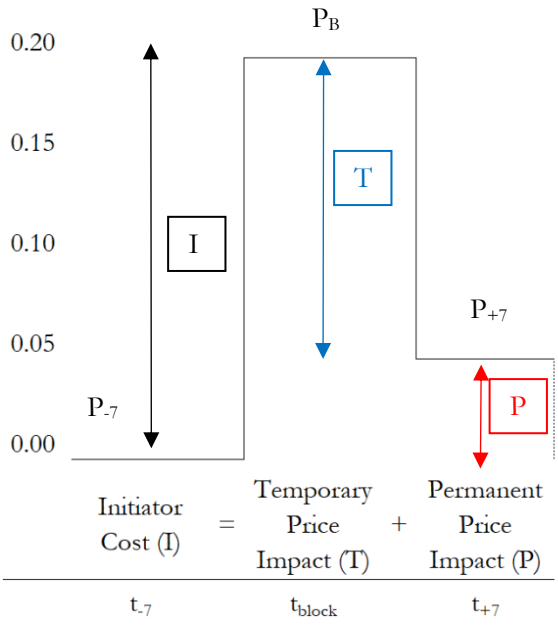


Figure 3

Decomposition of Block Initiator Costs

This figure shows the decomposition of block initiator costs for a hypothetical block buy by a customer at price P_B at time t_{block}. The bond trades at P_{-7} the week prior to the block trade at t_{-7} and at P_{+7} the week subsequent to the block trade at t_{+7}. The intermediating dealer offsets the block trade at a weighted-average buy price P_{Offset} at time t_{offset}. In Panel A, block initiator costs of 20bp are decomposed into a temporary price impact component (15bp) and a permanent price impact component (5bp). In Panel B, block initiator costs of 20bp are decomposed into two temporary price impact components, dealer spread (5bp) and receiver spread (5bp), and a permanent price impact component (5bp). The decomposition of a hypothetical block sell by a customer is analogous except reversed.

A. Temporary & Permanent Component



B. Dealer, Receiver & Permanent Component

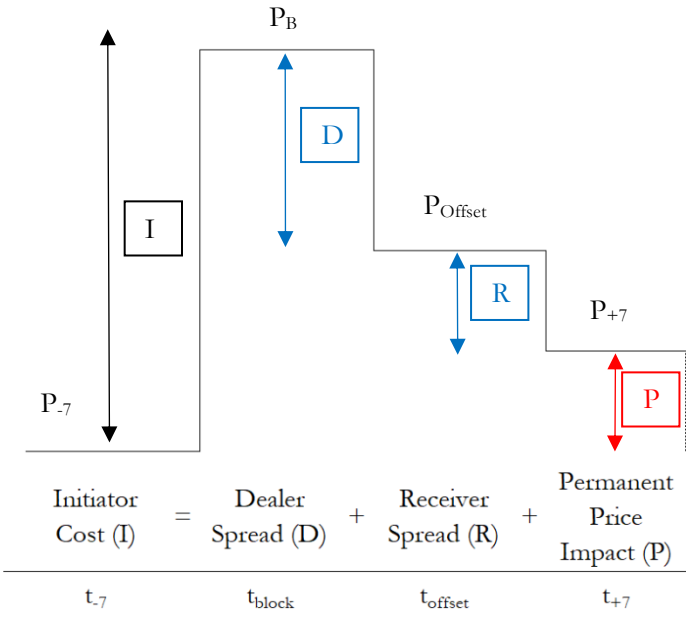
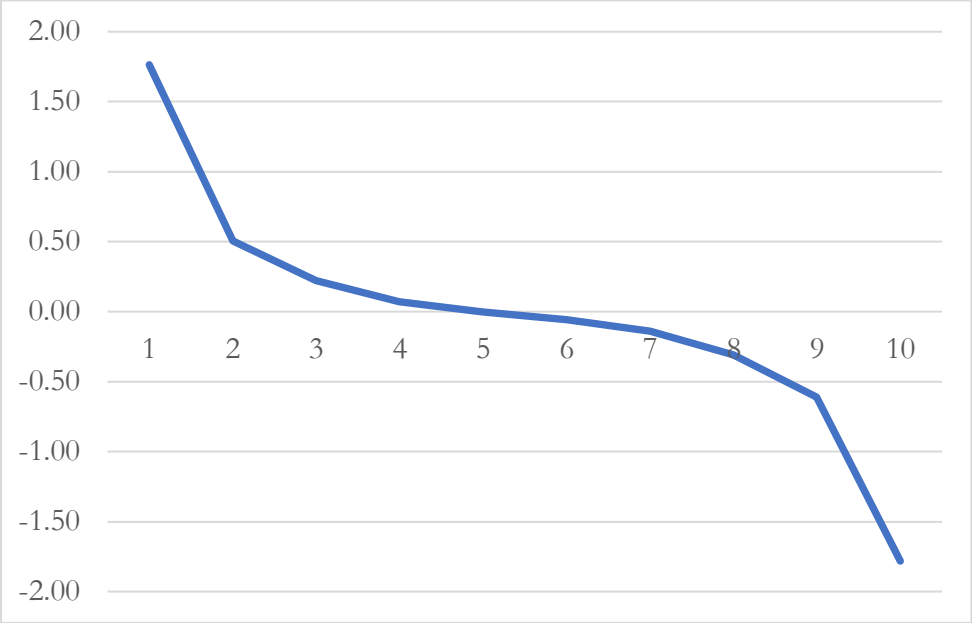


Figure 4

Dealer and Receiver Spreads, by Ex-Post Permanent Price Impact

This figure reports average spreads for each ex-post permanent price impact decile, where decile 1 captures the lowest price impact and decile 10 captures the highest price impact decile. These figures are constructed using the full sample of 205,104 block trades of at least $15 million. Panel A reports receiving investor spreads and Panel B reports dealer spreads.

A. Receiving Investor Spreads



B. Dealer Spreads

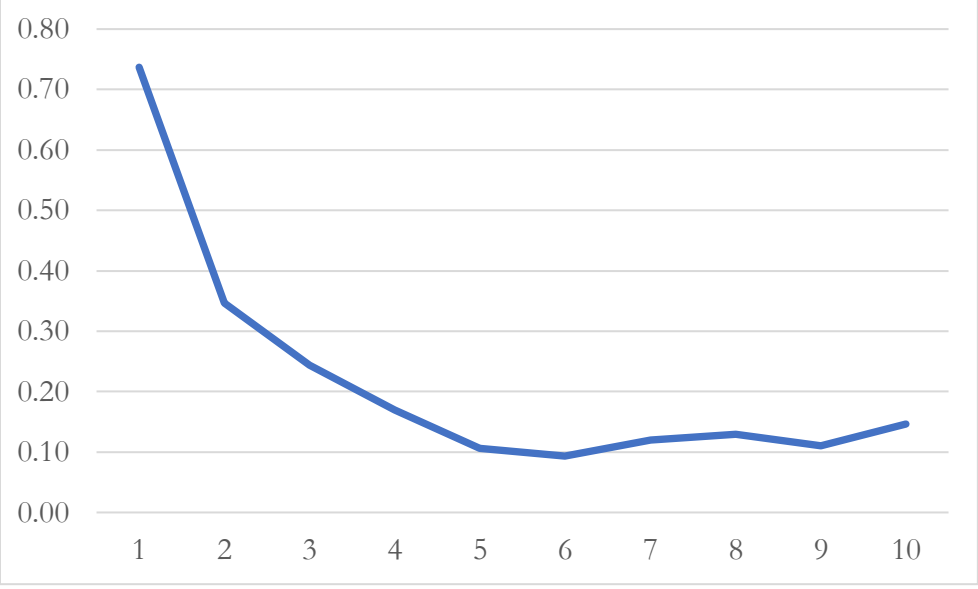


Figure 5

Receiver Spreads by Trade Sequence

This figure reports the receiving investor spread by trade sequence for the full sample of 205,104 block trades of at least $15 million. We report mean receiving investor spreads for the first, second, third, and fourth offsetting trades and for the fifth and higher offsetting trades.

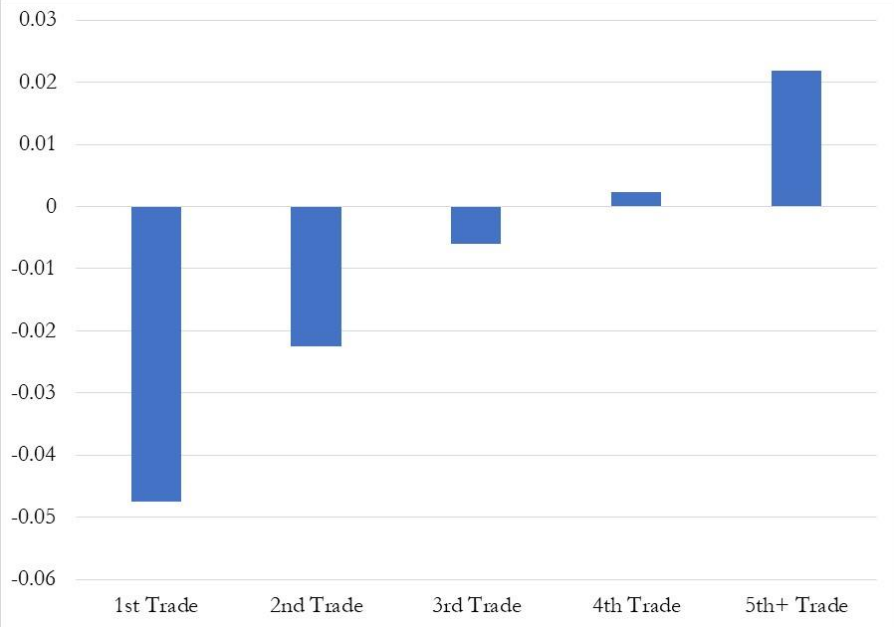


Table I
Block Trade Sample Description

Panel A summarizes the sample construction. Corporate bond trade data are from TRACE (Trade Reporting and Compliance Engine) and bond descriptive data are from the Mergent Fixed Income Securities Database (FISD). The sample period is July 2002 to November 2021. Our final sample consists of 38,762 cusips and 138,526,671 trades. Panel B describes the sample of block trades for four definitions of blocks. We only retain block trades with non-missing block cost measures. We exclude block trades that are fully offset by the block dealer in a single trade within 15 minutes, with cost measures that exceed $50, and with prices below $5.00.

Panel A: Sample Construction

	# Cusips	# Trades
Corporate bonds in FISD After FISD cleaning	55,842	
Corporate bonds in TRACE and FISD	39,801	147,886,718
Exclude bonds having less than 5 trades over the sample period	39,147	147,885,137
Exclude trades with a trade size > issue size	39,143	147,882,961
Exclude primary market transactions	39,106	146,212,835
Exclude trades reported after amount outstanding falls to zero	38,863	145,987,174
Exclude trades reported by dealer w/ offshore trades	38,861	143,677,740
Exclude trades immediately following offering date	38,767	138,528,434
Exclude 2002 trades with pre-July execution dates	38,762	138,526,671

Panel B: Sample Description

	Block >= $15M	Block $15M - $20M	Block $20M - $30M	Block >= $30M
# Observations	205,104	106,157	92,990	35,341
Investment Grade	146,052	73,286	67,015	26,160
High Yield	59,052	32,871	25,975	9,181
Large Dealer Counterparty	163,940	85,086	74,292	27,983
Small Dealer Counterparty	41,164	21,071	18,698	7,358
Average Block Size ($)	22,631,802	16,162,489	22,595,263	44,400,226
Single Block Size/Total Bond-Level Volume for Day	51%	48%	50%	53%

Table II
Receiving Investor Trade Sample Description

This table reports receiving investor trade sample statistics. Panel A reports the sample size of receiving investor trades and the number of block trades with more than one offsetting receiving investor trade. Panel B reports receiving investor trade size statistics. We report both the block-level receiving investor trade size based on the weighted average computed across all receiving investor trades in the block and the distribution of trade size across all individual receiving investor trades. Panel C reports statistics on the total amount of the block offset by receiving investor trades. Panel C statistics are computed at the block-level then averaged across all blocks.

	Block >= $15M	Block $15M - $20M	Block $20M - $30M	Block >= $30M
Panel A: Receiving Investor Sample Statistics				
# Block Observations	205,104	106,157	92,990	35,341
# Receiving Investor Trades	690,418	326,626	318,584	142,617
# Offsetting Trades by Receiving Investors	3.37	3.08	3.43	4.04
# Block Observations w/ Multiple Receiving Investor Trades	148,601	73,712	67,757	27,299
% Block Observations w/ Multiple Receiving Investor Trades	72%	69%	73%	77%
% Offsetting Trades "Customer" Receiving Investor Trades	71%	72%	71%	74%
Panel B: Receiving Investor Trade Size Statistics				
W.A. Receiving Investor Trade Size	8,913,353	7,730,210	9,798,451	15,572,302
% W.A. Receiving Investor Trades >= $15M	22%	21%	26%	35%
Distribution by Trade Size				
=<$100K	17%	18%	17%	15%
>$100K - <$1M	17%	17%	16%	15%
>=$1M - <$5M	26%	27%	26%	23%
>=$5M - <$10M	17%	18%	17%	16%
>=$10M - <$15M	11%	11%	11%	10%
>=$15M	12%	10%	14%	20%
Panel C: Amount of Offsets				
% of Block Trade Offset in Days [1,5]	64%	64%	64%	67%
% of Blocks Fully Offset in Days [1,5]	41%	44%	42%	42%

Table III

Block Trading Cost Decomposition

This table reports mean summary statistics of block trading costs. We examine block trades that exceed $15 million, greater than or equal to $15 and less than $20 million, greater than or equal to $20 million and less than $30 million, and greater than or equal to $30 million. Panel A reports block initiator costs. In Panel B, we decompose block initiator costs into a permanent price impact and temporary price impact component. In Panel C, we decompose block initiator costs into three components: 1) the permanent price impact, 2) dealer spread, and 3) receiving investor spread. In Panel D, we report trading cost estimates for investment grade and high yield bonds for the sample of block trades of at least $15 million. Initiator cost is defined as the log difference between the price of the bond one week prior to the block trade and the block price. Permanent price impact is defined as the log difference between the price of the bond one week following and one week prior to the block trade. Temporary price impact is defined as the log difference between the price of the bond one week following the block trade and the block price. Dealer spread is the log difference between the weighted average price that the dealer offsets the block trade and the block price. Receiving investor spread is the log difference between the price of the bond one week following the block trade and the weighted average price that the dealer offsets the block trade. The unit of analysis is at the individual block-level. Variables are winsored at the 1% and 99% levels.

Panel A: Block Initiator Costs					
	Block >= $15M		Block $15M - $20M	Block $20M - $30M	Block >= $30M
	Mean	Median		Mean	
Block Initiator Trading Cost	0.18	0.08	0.16	0.17	0.21
Panel B: Two-Way Decomposition					
Permanent Price Impact	0.00	0.01	0.00	0.01	-0.01
Temporary Price Impact	0.18	0.06	0.16	0.17	0.23
Panel C: Three-Way Decomposition					
Permanent Price Impact	0.00	0.01	0.00	0.01	-0.01
Dealer Spread	0.22	0.13	0.22	0.22	0.22
Receiving Investor Spread	-0.03	-0.03	-0.06	-0.05	0.00

Panel D: By Credit Rating				
	Investment Grade		High Yield	
	Mean	Median	Mean	Median
Block Initiator Cost	0.16	0.07	0.22	0.10
Permanent Price Impact	0.03	0.02	-0.08	0.00
Temporary Price Impact	0.13	0.05	0.32	0.11
Dealer Spread	0.18	0.11	0.31	0.23
Receiving Investor Spread	-0.05	-0.02	0.01	-0.04

Table IV
Receiver Spreads vs. Imputed Cost of Similar Sized Trades

This table reports hypothetical block trading costs for the receiving investor. We examine block trades that exceed $15 million, greater than or equal to $15 and less than $20 million, greater than or equal to $20 million and less than $30 million, and greater than or equal to $30 million. The unit of analysis is at the individual block-level. Panels A-D report mean summary statistics of hypothetical block trading costs for the receiving investor for the full sample, investment grade and high yield bonds, and by the number of receiving investor counterparties offsetting the block. To calculate imputed initiator cost, we use the regression coefficients reported in Appendix Table IV Column 1 and replace block size with the weighted average size of the offsetting trades by the receiving investors and measure the corporate bond index return around the time of the offsetting trades rather than the time of the triggering block trade. We then use the predicted values from this regression to calculate imputed initiator cost. We report imputed costs * (-1) so that receiver spreads are comparable to imputed costs. Receiving investor spread is computed as in previous tables and is the log difference between the price of the bond one week following the block trade and the weighted average price that the dealer offsets the block trade. Receiving investor savings is the (pairwise) difference between the imputed initiator cost and the realized receiving investor spread. *** on Receiving Investor Savings indicates the receiving investor spread is statistically different from the imputed cost as a trade initiator.

	Block >= $15M	Block $15M - $20M	Block $20M - $30M	Block >= $30M
Panel A: Full Sample				
Receiving Investor Spread	-0.03	-0.06	-0.05	0.00
Imputed Initiator Cost * (-1)	-0.14	-0.13	-0.14	-0.15
Receiving Investor Savings	0.10***	0.07***	0.09***	0.16***
Panel B: Investment Grade				
Receiving Investor Spread	-0.05	-0.06	-0.06	-0.04
Imputed Initiator Cost * (-1)	-0.12	-0.11	-0.12	-0.13
Receiving Investor Savings	0.07***	0.05***	0.07***	0.10***
Panel C: High Yield				
Receiving Investor Spread	0.01	-0.05	-0.04	0.11
Imputed Initiator Cost * (-1)	-0.18	-0.18	-0.19	-0.21
Receiving Investor Savings	0.19***	0.13***	0.15***	0.32***
Panel D: By # Counterparties				
	1-2 Offsetting Trades	3-5 Offsetting Trades	6-9 Offsetting Trades	10+ Offsetting Trades
Receiving Investor Spread	-0.08	0.00	0.04	0.12
Imputed Initiator Cost * (-1)	-0.15	-0.13	-0.12	-0.11
Receiving Investor Savings	0.07***	0.13***	0.16***	0.22***

Table V

Block Trading Cost Decomposition - Buys vs. Sells

This table reports summary statistics of block trading costs for block buys and block sells by trade size subsamples. We examine block trades that exceed $15 million, greater than or equal to $15 and less than $20 million, greater than or equal to $20 million and less than $30 million, and greater than or equal to $30 million. We decompose block initiator costs into two components: permanent price impact and temporary price impact; we then further decompose temporary price impact into two components: dealer spread and receiving investor spread. The unit of analysis is at the individual block-level. Panel A reports costs reported by trade size subsamples. Variables are winsored at the 1% and 99% levels. Panel B reports summary statistics of hypothetical block trading costs for the receiving investor separately for block buys and block sells. To compute imputed initiator cost, we use the regression coefficients reported in Appendix Table V Columns 1 and 6 and replace block size with the weighted average size of the offsetting trades by the receiving investors and corporate bond index return is measured around the time of the offsetting trades rather than the time of the triggering block trade. We then use the predicted values from this regression to compute imputed initiator cost. Receiving investor savings is the difference between the imputed initiator cost and the realized receiving investor cost. The unit of analysis is at the individual block-level. *** on Receiving Investor Savings indicates the receiving investor spread is statistically different from the imputed cost as a trade initiator.

Panel A: Cost Decomposition					
	Block >= $15M		Block $15M - $20M	Block $20M - $30M	Block >= $30M
	Mean	Median		Mean	
	Block Sells by Customer				
Block Initiator Cost	0.19	0.08	0.17	0.19	0.27
Permanent Price Impact	-0.04	0.01	-0.06	-0.03	-0.03
Temporary Price Impact	0.24	0.08	0.23	0.22	0.29
Dealer Spread	0.23	0.13	0.23	0.22	0.23
Receiving Investor Spread	0.01	-0.01	0.00	0.00	0.05
	Block Buys by Customer				
Block Initiator Cost	0.15	0.07	0.14	0.15	0.10
Permanent Price Impact	0.07	0.03	0.09	0.07	0.01
Temporary Price Impact	0.09	0.03	0.06	0.08	0.10
Dealer Spread	0.21	0.13	0.21	0.21	0.21
Receiving Investor Spread	-0.12	-0.06	-0.15	-0.13	-0.10
Panel B: Imputed Receiving Investor Block Cost					
	Block Sells by Customer				
Receiving Investor Spread	0.01	-0.01	0.00	0.00	0.05
Imputed Initiator Cost * (-1)	-0.19	-0.18	-0.19	-0.18	-0.17
Receiving Investor Savings	0.20***	0.16***	0.19***	0.19***	0.22***
	Block Buys by Customer				
Receiving Investor Spread	-0.12	-0.06	-0.15	-0.13	-0.10
Imputed Initiator Cost * (-1)	-0.13	-0.13	-0.13	-0.15	-0.17
Receiving Investor Savings	0.01**	0.03***	-0.03***	0.01	0.07***

Table VI

Mandated Trade Reporting and Block Trading Costs

This table reports changes in block costs for bonds that experienced a transparency event. We include four events: 144A bonds that experienced a transparency event in June 2014 and public bonds that experienced a transparency event in March 2003, October 2004, and February 2005. We focus on the 16-month period surrounding the event and 'Post' refers to trades that occur on or after the transparency event. To be included in the sample, bonds must have at least one block trade in the pre- and post-TRACE period. For both samples, we only retain observations with non-missing block initiator, block dealer, and receiving investor spread and price impact measures. Blocks are trades of $15 million or more. These filters yield 912 block trades for the June 2014 event, 622 block trades for the March 2003 event, 863 block trades for the October 2004 event, and 47 block trades for the February 2005 event. Panel A reports univariate statistics. Panel B reports multivariate tests. Regressions include trade-level and issue-level (the natural log of trade size and bond age, and indicators for on-the-run bonds and block trades intermediated by small dealers) and market controls (the trailing weekly corporate bond market index return, trailing weekly S&P index return, the change in the average three-month LIBOR interest rate, and the change in the VIX index over the previous week) and are estimated using issue-level fixed effects and standard errors clustered at the issue level. Dependent variable averages for the full sample are reported at the top of the regression and *p*-Values are reported below coefficients. Variables are winsored at the 1% and 99% levels. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	Initiator Cost		Dealer Spread		Receiving Investor	
Panel A: Univariate Statistics						
	Mean	Median	Mean	Median	Mean	Median
Pre-Transparency	0.18	0.13	0.23	0.19	-0.10	-0.05
Post-Transparency	0.20	0.07	0.18	0.14	-0.02	-0.03
Chg.	0.02	-0.05	-0.04	-0.05	0.08	0.02
Panel B: Multivariate Tests						
Dependent Variable Average	0.18		0.20		-0.06	
Post-Transparency	-0.052		-0.079***		0.106*	
	(0.382)		(0.005)		(0.091)	
Issue-level fixed effect	YES		YES		YES	
Trade-level controls	YES		YES		YES	
Market conditions controls	YES		YES		YES	
Observations	2,436		2,436		2,440	
Adjusted R^2	0.055		0.217		0.115	

Table VII
Trade Reporting Delay Regimes and Block Trading Costs

This analysis considers block trading costs over four regulatory periods that reduced the time dealers were required to report trades and in 2021 (the most recent year in the sample). To construct the sample, we exclude statistics for blocks that are reported more than 24 hours following the trade execution time and blocks trades for bonds that are not yet disseminated. We only retain observations with non-missing block initiator, block dealer, and receiving investor spread and price impact measures. We exclude block trades that are fully offset by the block dealer in a single trade within 15 minutes. Dollar spreads with absolute values that exceed $50 are deleted and block trades with prices below $5.00 are deleted. We require an offsetting trade by a receiving investor both before and after the trade is reported and we compute the weighted-average spread for both periods, resulting in two observations for each block trade. In Panel A, Column 1 reports statistics when trades were required to be reported within 75 minutes. Columns 2 and 3 report statistics when trades were required to be reported within 45 and 30 minutes, respectively. Column 4 reports statistics in the early one-year period when trades were required to be reported within 15 minutes. Column 5 reports statistics in 2021 (the last year in our sample). Panel B reports regressions with a 'Trades after Report' indicator for dealer and receiver spreads after the trade has been reported. Columns 1-4 use data over the July 2002 to June 2006 period and columns 5-6 use data over the January 2021 to November 2021 period. All regressions include block-level fixed effects and in columns (2) and (4) we also include controls for the average offsetting trade size and the percent of offsetting trades with a customer in the pre- and post-report periods. Standard errors are estimated using the Huber-White sandwich estimator. All variables are winsorized at the 1% and 99% levels. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

Panel A: Summary Statistics, By Period

	(1)	(2)	(3)	(4)	(5)
	July 2002-Sep. 2003	October 2003-Sep. 2004	October 2004-June 2005	July 2005-June 2006	2021
	75 Minutes	45 Minutes	30 Minutes	15 Minutes	15 Minutes
Dealer Spread					
- Before Report	0.30	0.16	0.26	0.23	0.22
- After Report	0.22	0.11	0.15	0.18	0.19
Chg. Dealer Spread	-0.08	-0.06	-0.11	-0.05	-0.03
Receiving Investor Spread					
- Before Report	-0.16	-0.08	-0.12	-0.02	-0.08
- After Report	-0.07	-0.02	0.01	0.00	-0.05
Chg. Receiver Spread	0.08	0.06	0.11	0.05	0.03

Panel B: Multivariate Tests

	(1)	(2)	(3)	(4)	(5)	(6)
	July 2002-June 2006				2021	
	Dealer Spread		Receiving Investor Spread		Dealer Spread	Receiver Spread
Dependent Variable Average	0.20	0.20	-0.06	-0.06	0.21	-0.06
Trades after Report	-0.075***	-0.054***	0.074***	0.049***	-0.029***	0.027***
	(0.000)	(0.000)	(0.000)	(0.002)	(0.001)	(0.010)
Block-Level Fixed Effect	YES	YES	YES	YES	YES	YES
Offset Trade Controls	NO	YES	NO	YES	NO	NO
Observations	10,670	10,670	10,670	10,670	8,510	8,510
Adjusted R-squared	0.216	0.224	0.780	0.782	0.166	0.809

Table VIII

Block Reporting Delay and Offsetting Behavior: by Trade Reporting Regime

This analysis considers dealers' strategic block reporting and offsetting behavior. We start with the sample of block trades described in Table I Panel B then we exclude block trades that are reported more than 24 hours following the trade execution time and block trades for bonds that are not yet disseminated. Panel A reports statistics on the timing of dealer trade reporting for the four reporting regimes used in Table VII and for 2021 (the most recent year in our sample). Panel B reports regressions of block activity and dealer offsetting behavior with indicators for whether the block occurred during the 45-minute, 30-minute, or 15-minute reporting regime and the 75-minute regime is the reference period. Regressions are estimated over the July 2002-June 2006 period. Regressions include trade-level (except the regression in Column (1)) and issue-level (the natural log of trade size, bond age, issue size, and indicators for bonds issued by financial firms, on-the-run bonds, and block trades intermediated by small dealers) and market controls (the trailing weekly corporate bond market index return, trailing weekly S&P index return, the average three-month LIBOR interest rate, and the VIX index over the previous week) and are estimated using robust standard errors. Regressions in Column (1) are based on cusip-week trading activity and do not include trade-level or small dealer controls. All variables are winsorized at the 1% and 99% levels. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)
Panel A: By Reporting Regime - Univariate					
	July 2002-Sep. 2003	October 2003-Sep. 2004	October 2004-June 2005	July 2005-June 2006	2021
	75 Minutes	45 Minutes	30 Minutes	15 Minutes	15 Minutes
Reporting Delay of Block Trades (in minutes)	25.08	17.76	15.14	13.72	14.58
% Reported w/ in 75 minutes	92%	93%	94%	96%	95%
% Reported w/ in 45 minutes	81%	90%	92%	94%	94%
% Reported w/ in 30 minutes	75%	88%	90%	93%	94%
% Reported w/ in 15 minutes	70%	82%	86%	90%	93%
% Offset Volume Before Block Trade Report	20%	17%	20%	20%	20%
% Reported Outside Regulation: >= $15M	8%	10%	10%	10%	7%
% Reported Outside Regulation: $15M - $20M	8%	8%	9%	9%	4%
% Reported Outside Regulation: $20M - $30M	7%	10%	11%	11%	12%
% Reported Outside Regulation: >= $30M	10%	13%	13%	13%	7%
% Reported Outside Regulation: all trades	7%	7%	4%	5%	
% Block Volume / Total Volume	3.43	3.21	3.29	3.43	2.50
% of Block Trade Offset in Days[1,5]	54%	53%	54%	54%	64%
% of Blocks Fully Offset	34%	33%	35%	34%	40%

Panel B: By Reporting Regime - Multivariate				
Dependent Variable	% Block Volume / Total Volume	% of Block Trade Offset in Days[1,5]	% of Blocks Fully Offset	% Offset Volume Before Report
45 Minute Regime	-0.107	-0.007	0.015	0.001
	(0.201)	(0.524)	(0.247)	(0.947)
30 Minute Regime	-0.226	0.015	0.037*	0.006
	(0.107)	(0.400)	(0.072)	(0.703)
15 Minute Regime	-0.404*	0.020	0.027	-0.024
	(0.058)	(0.486)	(0.398)	(0.334)
Trade-level controls	NO	YES	YES	YES
Issue-level controls	YES	YES	YES	YES
Market conditions controls	YES	YES	YES	YES
Observations	453,544	22,695	22,695	22,695
Adjusted R^2	0.040	0.013	0.006	0.018

Table IX

Strategic Block Trade Reporting

This table reports summary statistics for the sample of 187,531 block trades of at least $15 million (the full sample of 205,104 less trades that occurred prior to TRACE initiation). In Column (1) we report average values for the sample of block trades that were reported "fast", or before two minutes from the execution time. In Column (2) we report average values for the sample of block trades that were reported "slow", or within five minutes of the required reporting time or beyond the required time. In Column (3) we report average values for the sample of block trades that were reported "late", or outside of the required reporting time. In Columns (4) and (5) we report percent differences and *p*-Values from *t*-tests of differences between Slow and Fast trades. In Columns (6) and (7) we report percent differences and *p*-Values from *t*-tests of differences between Late and Fast trades.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Fast: w/in 2 Minutes after Execution	Slow: w/in 5 Minutes of Requirement	Late: Outside Regulation	Slow vs. Fast		Late vs. Fast	
Obs	115,679	20,758	9,670	% Diff	*p*-Value	% Diff	*p*-Value
Block Size	22,400,000	23,200,000	23,500,000	4%	***	5%	***
Mega Block ($30M)	13%	15%	17%	14%	***	26%	***
HY	27%	31%	19%	17%	***	-28%	***
Mega Block*HY	3%	4%	3%	33%	***	-5%	ns
Small Dealer	9%	28%	23%	219%	***	161%	***
Block Buy Indicator	36%	39%	43%	10%	***	20%	***
% Offset Before Report	21%	27%	23%	26%	***	7%	***
% Fully Offset	40%	40%	37%	-2%	**	-9%	***
# Receiver Trades	3.39	3.33	3.31	-6%	*	-2%	*

Appendix for

Receiving Investors in the Block Market for Corporate Bonds

Appendix A

Identifying Receiving Investor Trades

Having identified the initiating block trade (based on various definitions), we retain all trades by the block dealer in the bond during the week (i.e., five trading days) after the block trade (e.g., if the block occurs on Wednesday, the block week is from Wednesday to Friday, and the following Monday to Tuesday). We then, starting with block volume, cumulate the dealer's (signed) trading volume in the bond. If the cumulative imbalance reaches or crosses zero over the block week, we classify the block as being "fully offset".[33] For a block trade that is not fully offset, the percent that is offset equals [(block quantity-ending cumulative inventory)/block quantity)].

We define the "block end" time as the earlier of the time the block is fully offset or the end of the block week. We focus on one week for the following reasons. First, Bessembinder et al. (2018) show that the proportion of weekly trading volume that is carried into dealers' weekend inventory is generally less than 10%. Goldstein and Hotchkiss (2020) report median (mean) dealer holding periods of one (ten days). Hollifield et al. (2020) show more than 70% of large trades are matched within a week. Second, as the time from block trade increases, the link between a triggering block trade and the dealers' offsetting trades of opposite sign becomes less clear.

Receiving investor trades are identified as those that offset dealer's block position before the block end time. Specifically, we categorize the *earliest* large trade as the "trigger" block and opposite sign trades – both block and non-block – in the bond by the same dealer that occur before the block end time as receiving investor trades. After the block end time, the next block trade by the dealer in the bond is included in the initiating block sample. For each block trade, we calculate the price effects described in Section 4.1, and the percent of the block that is offset, defined as: Max [0, (block quantity-ending cumulative inventory)/block quantity)].

Below, we describe several examples, beginning with the easiest scenario. Suppose for Dealer A, we observe a $25 million customer buy at 10:00am, a $15 million sell at 11:00am, and a $10 million sell at

[33] This follows the spirit of Goldstein and Hotchkiss (2020) who construct a measure of dealer roundtrip costs.

11:05am. Our approach identifies the trigger trade as the $25 million block buy and the receiving investor trades as the two subsequent customer sells. Notably, while the $25 million trade is classified as initiating block trade, the $15 million and $10 million trade are classified as receiving investor trades. In this example, the block is fully offset, as cumulative imbalance equals zero, and the block period is defined as one day (i.e., the block start and end date are the same).

Alternatively, suppose we observe a $25 million customer buy at 10:00am and then observe several sell trades but the cumulative imbalance of Dealer A in the bond does not equal or cross zero during the block week. In that case, we classify the initiating block trade as not being fully offset and define the block period as the full week (i.e., the block end date equals the block start date plus four trading days).

A.1. Classification Issues: Identification of the Initiator Block Trade

One scenario is when the size of the triggering block trade is smaller than the size of the receiving investor trade. For example, suppose we observe a block sell trade of $15 million at 10:15am and a block buy trade of $20 million at 11:30am. Our approach identifies the trigger block trade as the $15 million even though the receiving investor trade has a larger size. One concern is that our approach may incorrectly identify the $15 million as the trigger trade.

We address this concern as follows. First, FINRA's reporting rules stipulate 15 minutes as the maximum reporting delay during the majority of our sample period. Thus, when the difference in trade timestamp between the trigger block and receiver trades exceeds the stipulated reporting delay, it is unlikely that our approach leads to misclassification. To minimize classification errors, we remove prearranged trades from the analyses; that is, scenarios where a trigger block trade is offset by the Dealer A with a single trade of identical size within 15 minutes.

Second, we define block trades using three thresholds, $15 million, $20 million and $30 million. For mega (e.g., $30 million) blocks, it is less likely that the initiating block trade is incorrectly classified. Third, in Appendix Table I below, we show that the percentage of fully offset blocks where the receiver trade occurs on the same day as the trigger block and *exceeds* the block trade size is only 6%. Further, the percentage of fully offset blocks where the receiving investor trade occurs within 15 minutes and *exceeds*

the block trade size is only 0.8%. These results suggest that the misclassification rate in the overall sample is likely to be low. Fourth, in Appendix Table II, we show that the main results of Table III analyses are unchanged when we exclude the 6% of block trades that are fully offset by a larger trade on the same day.

A.2. Examples of Classification

Example 1, $15 million block trade threshold:

Trade Execution Date	Initiator (I) or Receiver (R)	Signed Trade Size	Trade Hour	Trade Minute	Trade Second	Dealer ID	Cumulative Inventory	Percent Offset	Block End Date
3/4/2021	I	27,000,000	11	33	1	3341	27,000,000		
3/4/2021	R	-27,000,000	16	43	34	3341	0	100%	4-Mar-21
3/9/2021		15,000,000	11	53	41	3341	15,000,000		
3/9/2021		3,310,000	14	30	51	3341	18,310,000		
3/9/2021		1,000,000	15	3	53	3341	19,310,000		
3/9/2021		-20,000,000	17	1	55	3341	-690,000		

Dealer ID 3341 buys a block from a customer of $27 million at 11:33 on 3/4/2021. We retain *all* trades for this dealer over the next five trading days (3/4-3/10). We observe many block trades during the five-day period. The block buy of $27 million at 11:33, being the earliest trade, is identified as the initiating "trigger" block (identified by I in column 2). Sorting the data by trigger trade, then by execution time, we calculate the cumulative imbalance in the bond for the dealer. The dealer has an opposite sign sell trade of $27 million at 16:43. Since the cumulative imbalance equals zero at this time, we classify the block as being "fully offset" after this trade. The $27 million sell at 16:43, although it is a block, is classified as a "receiving investor" trade (identified by R in column 2). Because the imbalance equals zero on 3/4/21, the $15 million block buy on 3/9/21 at 11:53 is allowed to enter the initiating block sample.

Example 2, $15 million block trade threshold:

Trade Execution Date	Initiator (I) or Receiver (R)	Signed Trade Size	Trade Hour	Trade Minute	Trade Second	Dealer ID	Cumulative Inventory	Percent Offset	Block End Date
8/30/2021	I	-15,724,000	12	51	55	204	-15,724,000		
8/31/2021		-10,000	16	0	26	204	-15,734,000	0%	5-Sep-21

Dealer 204 sells a $15.7 million block to a customer on 8/30/21. We only observe one other trade for the dealer over the block-week, and this trade is not offsetting the inventory position. This block program ends

on 9/5/21 (Trading Day 5), and the percentage offset is set to 0%. This block is not included in our sample because the decomposition of trading costs requires at least one receiving investor trade.

Example 3, $15 million block trade threshold:

Trade Execution Date	Initiator (I) or Receiver (R)	Signed Trade Size	Trade Hour	Trade Minute	Trade Second	Dealer ID	Cumulative Inventory	Percent Offset	Block End Date
3/9/2021	I	15,000,000	11	53	41	3341	15,000,000		
3/9/2021		3,310,000	14	30	51	3341	18,310,000		
3/9/2021		1,000,000	15	3	53	3341	19,310,000		
3/9/2021	R	-20,000,000	17	1	55	3341	-690,000	100%	3/9/2021

Dealer 3341 buys $15 million from a customer at 11:53 (the initiating block trade, identified as I). We retain all trades for the dealer over the next five days. The dealer has two additional buys that brings the cumulative inventory to $19.3 million, and then has a large $20 million sell. The sell trade brings the dealer's cumulative imbalance below zero over the block week. Thus, the block is considered fully offset and the $20 million sell at 17:01 is classified as a receiving investor trade, identified as R. The $3.3 and $1 million trades are used for calculating the cumulative imbalance but are not included in the initiating block sample or receiving investor trade sample.

Example 4, $15 million block trade threshold:

Trade Number	Initiator (I) or Receiver (R)	Trade Execution Date	Signed Trade Size	Trade Hour	Trade Minute	Trade Second	Dealer ID	Cumulative Inventory	Percent Offset	Block End Date
1	I	6/8/2021	(15,000,000)	15	34	23	28	(15,000,000)		
2		6/8/2021	(165,000)	16	1	5	28	(15,165,000)		
3		6/8/2021	(1,000,000)	16	16	52	28	(16,165,000)		
4		6/8/2021	(1,050,000)	16	23	29	28	(17,215,000)		
5		6/9/2021	(2,000,000)	10	3	58	28	(19,215,000)		
6	R	6/9/2021	5,000,000	15	57	9	28	(14,215,000)		
7		6/9/2021	(500,000)	16	2	52	28	(14,715,000)		
8	R	6/9/2021	65,000	16	30	22	28	(14,650,000)		
9	R	6/10/2021	3,000,000	9	21	54	28	(11,650,000)		
10	R	6/10/2021	10,000,000	9	49	4	28	(1,650,000)		
11	R	6/10/2021	32,000	16	0	37	28	(1,618,000)		
12		6/11/2021	(5,000,000)	13	13	55	28	(6,618,000)		
13		6/11/2021	(300,000)	13	18	56	28	(6,918,000)		
14		6/11/2021	(30,000)	13	33	13	28	(6,948,000)		
15		6/11/2021	(100,000)	16	1	7	28	(7,048,000)		
16	R	6/14/2021	500,000	15	0	4	28	(6,548,000)	56%	14-Jun-21

Dealer 28 sells $15 million to a customer at 15:34 (the initiating block trade, identified as I) on 6/8/21. The dealer has 15 additional trades over the block week, of which nine are sell trades that increase the imbalance and six are buys trades that offset the imbalance. By the end of the block week on 6/14/21, the receiving

investor buy trades (i.e., trades 6, 8, 9, 10, 11 and 16 identified as R) total $18.6 million and the additional sell trades total $10.1 million, bringing the cumulative inventory to $6.55 million. Thus, the block is not considered fully offset, and the percent offset of the block position is set to ($15M-$6.55M)/ $15M = 56%.

Example 5, $15 million block trade threshold:

Trade Execution Date	Initiator (I) or Receiver (R)	Signed Trade Size	Trade Hour	Trade Minute	Trade Second	Dealer ID	Cumulative Inventory	Percent Offset	Block End Date
10/22/2021	I	20,000,000	11	17	35	204	20,000,000		
10/22/2021	R	(10,000,000)	10	57	25	204	10,000,000		
10/22/2021	R	(10,000,000)	11	2	11	204	0	100%	10/22/2021
10/26/2021		5,000,000	16	12	25	204	5,000,000		
10/26/2021		(5,000,000)	16	13	23	204	0		
10/28/2021		2,000,000	13	45	5	204	2,000,000		

Dealer 3341 buys $20 million from a customer at 11:17 on 10/22/21. Note that the $10 million sell to customer at 10:57 on 10/22/21 occurs prior to the $20 million trade; however, it is not a block trade under the $15 million block trade threshold. Thus, the $20 million trade at 11:17 is identified as the initiating block trade, identified as I. Trades are sorted first by the trigger trade, and then execution time on the block day. The two $10 million sell trades are classified as receiving investor trades identified as R. These two trades fully offset the block, so the additional trades by the block dealer on 10/26 and 10/28 are not classified as R.

Example 6, $15 million block trade threshold:

Trade Number	Initiator (I) or Receiver (R)	Trade Execution Date	Signed Trade Size	Trade Hour	Trade Minute	Trade Second	Dealer ID	Cumulative Inventory	Percent Offset	Block End Date
1	I	10/21/2021	15,000,000	8	2	41	28	15,000,000		
2		10/21/2021	1,000,000	7	37	23	28	16,000,000		
3	R	10/21/2021	(10,000,000)	8	35	28	28	6,000,000		
4	R	10/21/2021	(5,000,000)	9	34	52	28	1,000,000		
5	R	10/21/2021	(5,000,000)	9	35	7	28	(4,000,000)	100%	10/21/2021
6		10/21/2021	35,000,000	9	36	41	28	31,000,000		
7		10/21/2021	(10,000,000)	9	39	55	28	21,000,000		
8		10/21/2021	(10,000,000)	9	55	48	28	11,000,000		
9		10/21/2021	(5,000,000)	10	13	58	28	6,000,000		
10		10/21/2021	(5,000,000)	10	57	10	28	1,000,000		
11		10/21/2021	35,000,000	11	35	4	28	36,000,000		
12		10/21/2021	(10,000,000)	11	44	17	28	26,000,000		
13		10/22/2021	(500,000)	10	52	17	28	25,500,000		
14		10/25/2021	(12,600,000)	9	51	54	28	12,900,000		
15		10/25/2021	(5,000,000)	13	18	14	28	7,900,000		
16		10/25/2021	20,000,000	13	39	40	28	27,900,000		
17		10/25/2021	(2,000,000)	14	59	18	28	25,900,000		
18		10/26/2021	(2,000,000)	7	51	38	28	23,900,000		
19		10/26/2021	30,000,000	8	51	21	28	53,900,000		
20		10/26/2021	(10,000,000)	8	55	7	28	43,900,000		
21		10/26/2021	(5,000,000)	9	3	34	28	38,900,000		
22		10/26/2021	(10,000,000)	9	20	6	28	28,900,000		
23		10/26/2021	(5,000,000)	10	21	40	28	23,900,000		
24		10/26/2021	(5,000,000)	10	52	45	28	18,900,000		
25		10/26/2021	(195,000)	16	4	25	28	18,705,000		
26		10/27/2021	(2,090,000)	8	25	14	28	16,615,000		
27		10/27/2021	20,000,000	10	15	42	28	36,615,000		
28		10/27/2021	3,000,000	12	46	2	28	39,615,000		
29		10/27/2021	340,000	12	59	27	28	39,955,000		
30		10/27/2021	1,500,000	13	58	31	28	41,455,000		

Dealer 3341 buys $15 million from a customer (the initiating block trade, identified as I) on 10/21/21 at 8:02. There are 30 additional trades during the block week. The second trade increases cumulative balance to $16 million. The third and fourth trades are opposite sign trades that reduce the cumulative balance to $1 million. The fifth trade further reduces the cumulative balance to -$4 million, resulting in cumulative imbalance switching signs (i.e., zero crossing). We consider the block to be fully offset and Trades 3, 4, and 5 are classified as receiving investor trades, denoted as R. Because the block trade 1 is fully offset, we allow the $35 million block buy on 10/21/21 at 9:36 to enter the sample as an initiating block trade.

Example 7, $20 million block trade threshold sample:

Trade Execution Date	Initiator (I) or Receiver (R)	Signed Trade Size	Trade Hour	Trade Minute	Trade Second	Dealer ID	Cumulative Inventory	Percent Offset	Block End Date
3/9/2021	I	-20,000,000	17	1	55	3341	-20,000,000		
3/9/2021	R	15,000,000	11	53	41	3341	-5,000,000		
3/9/2021	R	3,310,000	14	30	51	3341	-1,690,000		
3/9/2021	R	1,000,000	15	3	53	3341	-690,000	96.6%	3/15/2021

Note that Example 7 is identical to Example 3. Dealer 3341 buys $15 million from a customer at 11:53 on 3/9/21. However, the trade size of $15 million is below the block trade threshold for the $20 million analysis. Thus, the $20 million sell trade by the customer is identified as the trigger block trade, identified by I. We retain all trades for the dealer over the next five days, including the block trade day. The dealer has three buy trades that are classified as R and they add up to $19.3 million, and the cumulative imbalance on Day 5 is -$690,000. Thus, the percent offset for the block is 96.6% (i.e., (20,000,000-690,000)/20,000,000). In this study, we present results based on three block trade samples using thresholds $15 million, $20 million and $30 million.

A.3. Example of Trading Cost Measures Computation

Trade Execution Date	Signed Trade Size	Trade Price	Trade Time	Weight	Weight*Price
8/10/2021	-15,000,000	122.855	10:05		
8/10/2021	10,000,000	122.599	11:15	67%	81.733
8/10/2021	4,000,000	122.600	3:15	27%	32.693
8/11/2021	1,000,000	122.679	10:00	7%	8.179
			WA Offset Price		122.605
WA $Price_{t-7}$	122.650				
WA $Price_{t+7}$	122.680				

In this example, a dealer sold $15 million to a customer for $122.855 (the block price). The bond was trading at $122.650 the week prior (the weighted average trade price at t-7) and the bond was trading at $122.680 the week after (the weighted average trade price at t+7). The dealer offsets the block with three R trades at a weighted average buy price of $122.605.

Initiator cost = 0.17 = ((ln(122.855)-ln(122.650)*100).

. Dealer spread = 0.20 = ((ln(122.855)-ln(122.605)*100).

Receiving investor spread = -0.06 = ((ln(122.605)-ln(122.680)*100).

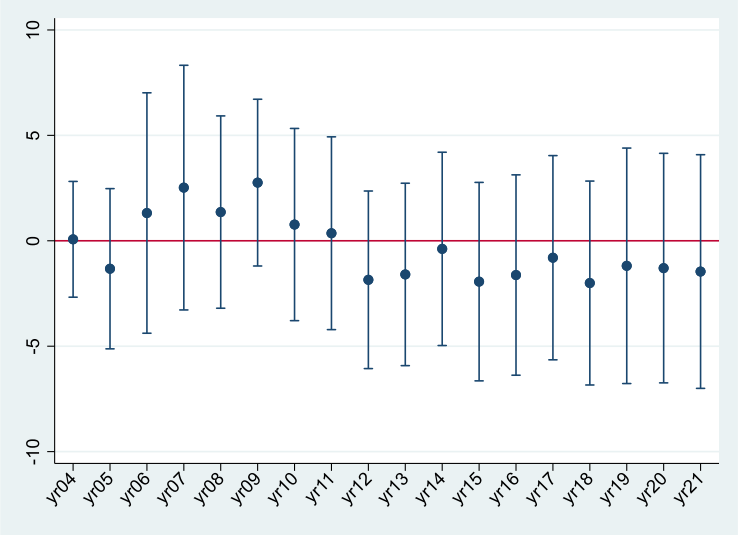
Permanent Price Impact = -0.02 = ((ln(122.680)-ln(122.650)*100).

Appendix Figure 1

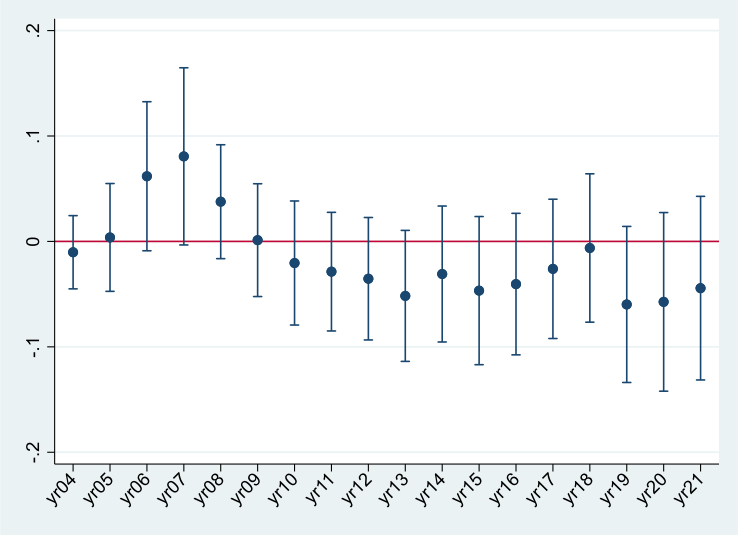
Block Trading: Year Effects

These figures show the coefficients on year dummies for regressions of block activity on issue characteristics and market conditions. Regressions report Newey-West standard errors. Circles represent the regressions coefficients and bars represent the 95% confidence interval. Years 2002 and 2003 are omitted in the regressions. Figure A shows the results when block trading relative to total volume is the dependent variable (reported as a percent). Figure B shows the percent of block trades that are prearranged, defined as blocks that are offset in a single trade within 15 minutes. For both figures, blocks are defined as trade sizes of at least $15 million. Data are organized on a weekly basis and regressions include 1,023 observations. Regression controls include log age, log issue size, and the percentage of traded bonds that are high yield, financial sector, and 144A bonds, and the trailing weekly corporate bond market index return, the trailing weekly S&P index return, the average three-month LIBOR interest rate, and the level of the VIX index over the preceding five days.

A. Block Volume / Total Volume



B. % Block Prearranged

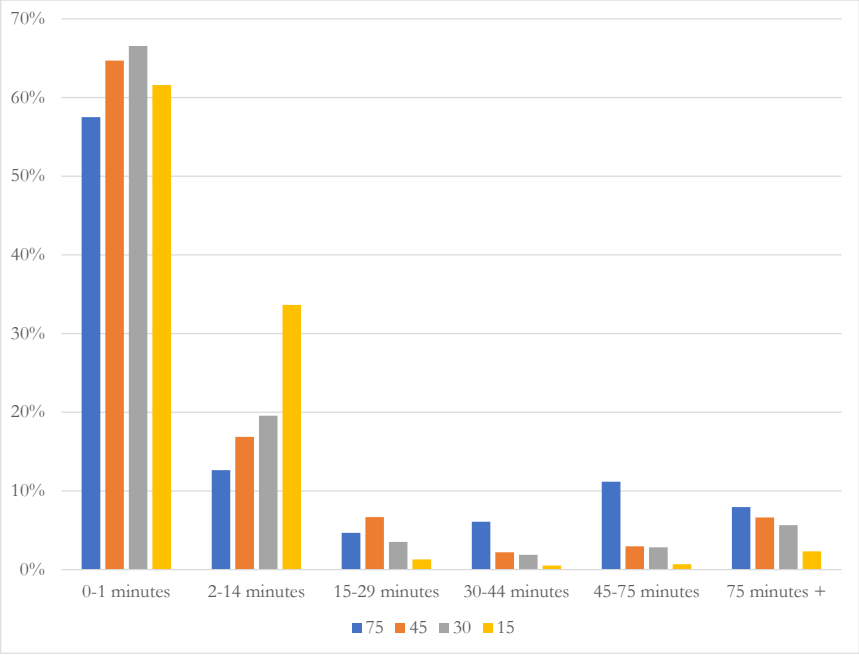


Appendix Figure 2

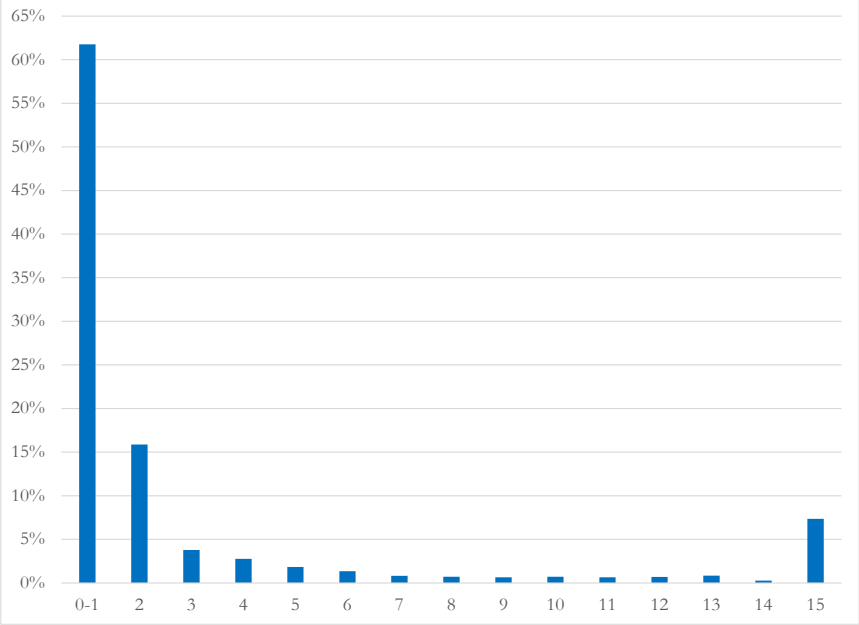
Block Trade Time to Report

This figure shows the average time for dealers to report block trades (relative to the execution time) for the sample of trades of at least $15 million. In 2.A, we report a histogram of time to report for block trades conducted in the 75-minute, 45-minute, 30-minute, and 15-minute reporting regimes. In 2.B, we report a histogram of time to report for block trades conducted in the most recent sample year (2021) when the required report time was 15-minutes.

A: Full Sample



B. 2021 Sample



Appendix Table I
Initiator Trade Classification Analysis

This table reports statistics on cases for which the initiating block trade is difficult to classify. In the first row, we report the percent of blocks with at least one offsetting receiving investor trade that exceeds the trade classified as the initiating block trade. In the second row, we report the percent of fully offset blocks with at least one offsetting receiving investor trade on the day of the initiating block trade that exceeds the size of the initiating block trade. In the third row, we report the percent of fully offset blocks with at least one offsetting receiving investor trade within 15 minutes of the initiating block trade that exceeds the size of the initiating block trade.

	Block >= $15M	Block $15M - $20M	Block $20M - $30M	Block >= $30M
% Receiving Investor Trade Size > Block Size	10%	16%	12%	9%
% Receiving Investor Trade Size > Block Size and Offset in 1 Day	6%	10%	8%	5%
% Receiving Investor Trade Size > Block Size and Offset in 15 Minutes	0.8%	1.3%	1.0%	0.7%

Appendix Table II
Block Trading Cost Decomposition-Robustness

This table reports mean summary statistics of block trading costs for block trades that exceed $15 million. In Columns (1)-(2), we further refine the sample utilized in Table III by excluding fully offset blocks with an offset trade size that exceeds the triggering initiator trade size on the same day as the block. In Columns (3)-(4), we further refine the sample utilized in Table III by excluding "reversal" block trades, cases for which the block trade price exceeds both the weighted average price in the week prior and the weighted average price in the week following the block trade by at least 15%, or the block price is less than both prices by the same magnitude. Panel A reports block initiator costs. In Panel B, we decompose block initiator costs into a permanent price impact and temporary price impact component. In Panel C, we decompose block initiator costs into three components: 1) the permanent price impact, 2) dealer profit, and 3) receiving investor profit. In Panels D and E, we report trading cost estimates for investment grade and high yield bonds, respectively. Initiator cost is defined as the log difference between the price of the bond one week prior to the block trade and the block price. Permanent price impact is defined as the log difference between the price of the bond one week following and one week prior to the block trade. Temporary price impact is defined as the log difference between the price of the bond one week following the block trade and the block price. Dealer spread is the log difference between the weighted average price that the dealer offsets the block trade and the block price. Receiving investor spread is the log difference between the price of the bond one week following the block trade and the weighted average price that the dealer offsets the block trade. The unit of analysis is at the individual block-level. Variables are winsored at the 1% and 99% levels.

	Mean	Median	Mean	Median
	Exclude blocks with offset trade > initiator trade		Exclude "reversal" block trades >=15%	
Panel A: Block Initiator Costs				
Block Initiator Trading Cost	0.19	0.08	0.17	0.08
Panel B: Two-Way Decomposition				
Permanent Price Impact	0.00	0.02	0.00	0.01
Temporary Price Impact	0.19	0.06	0.18	0.06
Panel C: Three-Way Decomposition				
Permanent Price Impact	0.00	0.02	0.00	0.01
Dealer Spread	0.22	0.13	0.22	0.13
Receiving Investor Spread	-0.03	-0.02	-0.04	-0.03
Panel D: Investment Grade				
Block Initiator Cost	0.17	0.07	0.16	0.07
Permanent Price Impact	0.04	0.02	0.03	0.02
Temporary Price Impact	0.13	0.05	0.13	0.05
Dealer Spread	0.18	0.11	0.18	0.11
Receiving Investor Spread	-0.05	-0.02	-0.05	-0.02
Panel E: High Yield				
Block Initiator Cost	0.23	0.11	0.21	0.10
Permanent Price Impact	-0.08	0.00	-0.08	0.00
Temporary Price Impact	0.33	0.11	0.30	0.11
Dealer Spread	0.31	0.23	0.31	0.23
Receiving Investor Spread	0.02	-0.04	0.00	-0.04

Appendix Table III
Receiving Investor Spread: by Counterparty Type

This table reports receiving investor srpeads by counterparty type. We examine block trades that exceed $15 million. The unit of analysis is at the individual block-level. 'Majority customer counterparty' are block trades for which 50% or greater of the offsetting trades with receiving investors are customers. 'Majority small dealer counterparty' are block trades for which 50% or greater of the offsetting trades with receiving investors are with small dealers. 'Majority large dealer counterparty' are block trades for which 50% or greater of the offsetting trades with receiving investors are with large dealers. 'Mix of counterparties' are block trades that do not fit any of the above definitions. Large dealers are defined as the thirty-four most active dealers studied by Bessembinder, Jacobsen, Maxwell, and Venkataraman (2018). All other dealers are coded as 'small dealers'.

	Obs	Receiving Investor Spread
Majority Customer Counterparty	160,366	-0.04
Majority Small Dealer Counterparty	36,335	-0.03
Majority Large Dealer Counterparty	6,246	0.00
Mix of Counterparties	2,154	-0.04

Appendix Table IV
Determinants of Block Trading Costs

This table shows regressions of measures of block trading costs on bond characteristics, intermediating dealer size, and market conditions. All regressions are estimated using year fixed effects and robust standard errors. The unit of analysis is at the individual block-level. Dependent variables are winsored at the 1% and 99% levels. Dependent variable averages are reported at the top of the regression.

	(1)	(2)	(3)	(4)	(5)
	Block Initiator	Permanent Price Impact	Temporary Price Impact	Dealer Spread	Receiving Investor Spread
Dependent Variable Average	0.179	0.000	0.185	0.220	-0.034
Log(Block Size)	0.039***	-0.007	0.064***	-0.003	0.067***
	(0.002)	(0.620)	(0.000)	(0.345)	(0.000)
Log (Bond Age)	0.008*	-0.016***	0.026***	0.020***	0.005*
	(0.069)	(0.000)	(0.000)	(0.000)	(0.084)
Log (Issue Size)	-0.041***	0.030***	-0.074***	-0.047***	-0.024***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
High Yield Indicator	0.043**	-0.101***	0.157***	0.105***	0.054***
	(0.030)	(0.000)	(0.000)	(0.000)	(0.000)
Financial Indicator	-0.039***	-0.006	-0.035***	-0.036***	-0.000
	(0.001)	(0.526)	(0.000)	(0.000)	(0.943)
On-the-run Indicator	0.007	0.006	-0.002	0.004	-0.007
	(0.495)	(0.624)	(0.819)	(0.169)	(0.428)
144A Indicator	-0.017	-0.030*	0.015	0.007*	0.006
	(0.140)	(0.066)	(0.232)	(0.067)	(0.600)
Small Dealer Indicator	0.014*	0.024**	-0.008	0.007**	-0.011
	(0.058)	(0.048)	(0.409)	(0.025)	(0.179)
Corp Bond Index Return over Relevant Period	-0.140***	-0.101***	0.151***	0.072***	0.053***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Ave. Stock Market Index Return (t-1 to t-5)	-4.204***	-9.617***	3.691***	-0.334	4.215***
	(0.001)	(0.000)	(0.007)	(0.361)	(0.000)
Ave. 3-Month Libor (t-1 to t-5)	0.046**	0.024	0.030	0.019***	0.015
	(0.038)	(0.376)	(0.138)	(0.003)	(0.389)
Ave. VIX (t-1 to t-5)	0.003*	-0.012***	0.016***	0.011***	0.004***
	(0.095)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	-0.043	0.046	-0.393**	0.556***	-0.974***
	(0.805)	(0.853)	(0.044)	(0.000)	(0.000)
Observations	205,021	205,072	205,021	205,021	205,058
Adjusted R-squared	0.008	0.007	0.013	0.063	0.003

Appendix Table V
Determinants of Block Trading Cost Regressions: Buys vs. Sells

This table shows regressions of measures of block trading costs on bond characteristics, intermediating dealer size, and market conditions. All regressions are estimated using year fixed effects and robust standard errors. Columns (1)-(5) show results for block sells and columns (6)-(10) show results for block buys. To be included in the sample, we retain observations with non-missing block initiator, block dealer, and receiving investor spread and price impact measures. Blocks are trades of $15 million or more. We exclude block trades that are fully offset by the block dealer in a single trade within 15 minutes. Dollar spreads with absolute values that exceed $50 are deleted. We exclude block trades with prices below $5.00. The unit of analysis is at the individual block-level. Dependent variables are winsored at the 1% and 99% levels.

	Block Sells					Block Buys				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Initiator	Perm. Price Impact	Temp. Price Impact	Dealer	Receiving	Initiator	Price Impact	Temp. Price Impact	Dealer	Receiving
Dependent Variable Average	0.19	-0.04	0.24	0.23	0.01	0.15	0.07	0.09	0.21	-0.12
Log(Block Size)	0.074***	0.053***	0.051***	-0.008**	0.054***	-0.026*	-0.077***	0.042**	-0.000	0.056***
	(0.000)	(0.001)	(0.000)	(0.046)	(0.000)	(0.094)	(0.001)	(0.032)	(0.976)	(0.001)
Log (Bond Age)	-0.010***	-0.033***	0.025***	0.021***	0.003	0.032***	0.009	0.026***	0.020***	0.005
	(0.002)	(0.000)	(0.000)	(0.000)	(0.431)	(0.000)	(0.151)	(0.000)	(0.000)	(0.278)
Log (Issue Size)	-0.043***	0.053***	-0.105***	-0.046***	-0.051***	-0.035***	-0.021*	-0.009	-0.049***	0.037***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.067)	(0.332)	(0.000)	(0.000)
High Yield Indicator	0.018	-0.189***	0.213***	0.124***	0.088***	0.076***	0.016	0.078***	0.076***	0.011
	(0.108)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.450)	(0.000)	(0.000)	(0.467)
Financial Indicator	-0.039***	-0.022**	-0.021**	-0.033***	0.005	-0.042***	0.003	-0.039***	-0.035***	-0.007
	(0.000)	(0.040)	(0.012)	(0.000)	(0.461)	(0.000)	(0.867)	(0.002)	(0.000)	(0.482)
On-the-run Indicator	0.013	0.030**	-0.022*	0.003	-0.025**	0.001	-0.020	0.030*	0.006	0.014
	(0.180)	(0.035)	(0.056)	(0.409)	(0.010)	(0.945)	(0.298)	(0.069)	(0.230)	(0.308)
144A Indicator	0.003	0.007	-0.009	0.012***	-0.016	-0.065***	-0.128***	0.073***	0.002	0.058***
	(0.828)	(0.709)	(0.557)	(0.006)	(0.208)	(0.000)	(0.000)	(0.000)	(0.777)	(0.001)
Small Dealer Indicator	0.001	0.007	-0.011	0.007*	-0.009	0.034***	0.029	0.013	0.009*	0.007
	(0.885)	(0.622)	(0.305)	(0.060)	(0.346)	(0.004)	(0.112)	(0.396)	(0.093)	(0.589)
Corp Bond Index Return over Period	-0.677***	-0.773***	1.266***	0.438***	0.776***	0.722***	0.862***	-1.527***	-0.469***	-0.922***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Ave. Stock Market Index Return (t-1 to t-5)	-23.634***	-16.250***	8.923***	-1.704***	-2.331*	28.117***	13.112***	-8.480***	1.399**	7.033***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.062)	(0.000)	(0.000)	(0.000)	(0.018)	(0.000)
Ave. 3-Month Libor (t-1 to t-5)	0.065***	-0.026	0.075***	0.044***	0.046**	0.017	0.141***	-0.058*	-0.023**	-0.061**
	(0.001)	(0.390)	(0.002)	(0.000)	(0.024)	(0.530)	(0.001)	(0.084)	(0.034)	(0.031)
Ave. VIX (t-1 to t-5)	0.006***	-0.016***	0.027***	0.011***	0.009***	0.006***	0.011***	-0.008***	0.009***	-0.009***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	-0.517***	-0.932***	0.005	0.579***	-0.518***	0.704***	1.116***	-0.410	0.627***	-1.321***
	(0.009)	(0.001)	(0.984)	(0.000)	(0.007)	(0.008)	(0.007)	(0.233)	(0.000)	(0.000)
Observations	130,056	130,087	130,056	130,056	130,079	74,965	74,985	74,965	74,965	74,979
Adjusted R-squared	0.111	0.170	0.090	0.134	0.136	0.126	0.203	0.089	0.111	0.188

Appendix Table VI
Mandated Trade Reporting and Dealer Activity

This analysis considers changes to dealers' propensity to intermediate blocks and propensity and speed of offsetting block positions following the introduction of TRACE. This table is based on the sample utilized in Table V. Panel A shows univariate results and Panel B shows the impact of transparency on block activity and dealer offsetting behavior in a multivariate setting. The regression in Column (1) is estimated using cusip-week block activity, includes the trailing weekly S&P index and the change in the average three-month LIBOR interest rate and VIX index over the previous week, and is estimated using issue-level fixed effects and standard errors clustered at the issue level. Regressions in Columns (2)-(4) include trade-level and issue-level (the natural log of trade size, bond age, and indicators for on-the-run bonds and block trades intermediated by small dealers) and market controls (the trailing weekly corporate bond market index return, trailing weekly S&P index return, the change in the average three-month LIBOR interest rate, and the change in the VIX index over the previous week) and are estimated using issue-level fixed effects and standard errors clustered at the issue level. Regressions in Column (1) are based on cusip-week trading activity and do not include trade-level or small dealer controls. All variables are winsorized at the 1% and 99% levels. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)
Panel A: Transparency - Univariate				
	% Block Vol / Tot Volume	% Offset Days[1,5]	% Fully Offset	Hours to Offset
Pre-Transparency	4.85	60%	37%	117.7
Post-Transparency	4.80	63%	41%	110.1
Chg.	-0.06	3%	4%	-7.6
Panel B: Transparency - Multivariate				
	% Block Vol / Tot Volume	% Offset Days[1,5]	% Fully Offset	Hours to Offset
Post-Transparency	-0.150	0.062***	0.062**	-8.444**
	(0.434)	(0.010)	(0.028)	(0.039)
Issue-level fixed effect	YES	YES	YES	YES
Trade-level controls	NO	YES	YES	YES
Issue-level controls	YES	YES	YES	YES
Market conditions controls	YES	YES	YES	YES
Observations	31,396	2,436	2,436	2,436
Adjusted R^2	0.018	0.113	0.105	0.127

Appendix Table VII

Block Trading Costs and Trade Reporting Changes - Full Sample Results

This analysis considers block trading costs over four regulatory periods that reduced the time dealers were required to report trades and in 2021 (the most recent year in the sample). To construct the sample, we exclude statistics for blocks that are reported more than 24 hours following the trade execution time and blocks trades for bonds that are not yet disseminated. We only retain observations with non-missing block initiator, block dealer, and receiving investor spread and price impact measures. We exclude block trades that are fully offset by the block dealer in a single trade within 15 minutes. Dollar spreads with absolute values that exceed $50 are deleted and block trades with prices below $5.00 are deleted. We compute the weighted-average spread for both the before and after trade report periods. Column (1) reports statistics when trades were required to be reported within 75 minutes. Columns (2) and (3) report statistics when trades were required to be reported within 45 and 30 minutes, respectively. Column (4) reports statistics in the early one-year period when trades were required to be reported within 15 minutes. Column (5) reports statistics in 2021 (the last year in our sample). All variables are winsorized at the 1% and 99% levels.

	(1)	(2)	(3)	(4)	(5)
	July 2002-September 2003	October 2003-September 2004	October 2004-June 2005	July 2005-June 2006	2021
	75 Minutes	45 Minutes	30 Minutes	15 Minutes	15 Minutes
Dealer Spread					
- Before Report	0.28	0.15	0.23	0.20	0.21
- After Report	0.19	0.09	0.12	0.13	0.16
Diff. Dealer Spread	-0.09	-0.06	-0.11	-0.07	-0.05
Receiving Investor Spread					
- Before Report	-0.10	-0.07	-0.11	0.01	-0.07
- After Report	-0.06	-0.03	-0.07	-0.05	-0.07
Diff. Receiver Spread	0.05	0.04	0.04	-0.06	0.00