Bond Quotes Are Often More Informative Than Trade Prices

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1 Introduction

Market participants often must estimate security values when valuing positions they or others hold. They also need to value securities when they trade them. Accurate security value estimates allow investors and broker-dealers to manage risk better, fund managers to compute NAV more precisely (and thus price deposits and redemptions more fairly), and traders to negotiate better prices.

Current values are never known with certainty because nobody has complete information about all factors that ultimately determine security values. However, when securities trade in financial markets, people look to traded prices, firm quotes, and indications for information about security values. Traded prices are the prices at which trades occurred in the past. Firm quotes are prices at which broker-dealers (and others who quote prices) have committed to trade on-demand from others. Finally, indications are prices at which traders suggest they may be willing to trade, possibly subject to further negotiation.

This study examines trade prices, quotes (including indications) to determine when quotes are more informative than last trade prices about current security values. The results show that quotes generally provide higher quality information about current values than last trade prices when last trade prices occurred on a previous day.

1.1 Trade Prices, Quoted Prices, and Indications

Last trade prices reveal current security values if security values have not changed much since the trades occurred. The longer the time since a trade, the less informative the price is about values because during long periods, the market often learns new information about values.

Trade prices also are more informative when well-informed participants arrange the trades. Since large institutional traders tend to be well informed, market participants assume that the prices of institutional trades of $1 million and above are more informative than those of smaller trades. Average daily volume

statistics from FINRA TRACE indicate that these large institutional transactions account for approximately 80% of total trade volume.

Firm quotes are quotes at which the quoter will trade on demand. They generally are offered on electronic trading systems by broker-dealers. The reveal current values if the spread between the best bid (highest bid) and best offer (lowest offer) prices is not large and is symmetric about the current value. However, many firm quotes are only for small trade sizes. As with traded prices, most market participants believe institutional size bids and offers are more informative than smaller quotes. The presumption that quotes reflect values is based on the observation that firm quotes allow well-informed traders to buy or sell when they see quoted prices that do not reflect values. Accordingly, broker-dealers and others who quote firm prices risk losing to better-informed traders when they quote prices that do not reflect values. This adverse selection risk forces traders to consider values carefully when making firm quotes on electronic trading platforms.[1]

Indications are quotes that are not firm. Broker-dealers usually make them for institutional sizes and deliver them via Bloomberg messages rather than posting them on electronic trading platforms. Indications reveal values when broker-dealers regularly honor their quotes and when the indications are not too far from the market. Broker-dealers usually honor their indications because dealers who often fade from them (raise their indicated offers when selling or lower their indicated bids when buying) frustrate their institutional clients. The latter tend to shun them in the future. Indications generally become less reliable as they grow older.

Institutional traders often arrange trades at prices better than those quoted or indicated by broker-dealers. Broker-dealers will not provide aggressive prices when they fear that their clients may know values better than they do. Instead, they give themselves wiggle room. Quotes tend to widen as the time since the last trade lengthens because uncertainty about values increases with time.

1.2   Price Information in the U.S. Bond Markets

1.2.1   Trade Prices

Broker-dealers arrange most trades in U.S. bond markets. ATSs—exchange-like bond trading systems—increasingly assist dealers and some large institutions with these arrangements. However, only a small fraction of all bond trading occurs on ATS platforms. Non-ATS electronic trading platforms like Request for Quote (RFQ) systems account for larger volumes than ATS systems, but less than 30% of corporate bond transaction volume trades electronically. In addition, organized exchanges such as NYSE Bonds trade only a tiny fraction of all bond volume.

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[1] Strictly speaking, dealers quote prices that produce two-sided order flow—order flow with equal aggregate quantities on both sides of the market. If many uninformed traders are on one side of the market, dealers may adjust prices so that informed traders will be on the other side of the market. The dealers then profit from buying at their bid prices and selling at their ask prices. The informed traders profit because they can buy securities at low prices when uninformed traders are selling or sell securities at high prices when uninformed traders are buying. The competition among informed traders for these profits ensures that prices remain close to values.

Broker-dealers report information about their trades to FINRA's TRACE trade reporting system, which then distributes it to the public after truncating trade sizes at $5M for investment-grade bonds and $1M for high-yield bonds.[2] ATS platforms and non-ATS electronic trading systems also disseminate information about the trades that they arrange to FINRA's TRACE trade reporting system.

1.2.2   Quoted and Indicated Prices

Except at the largely insignificant exchange bond markets, U.S. bond market participants and ATSs do not report firm quotes or indications to the public. Many broker-dealers and some institutional clients post firm quotes to various ATSs. In addition, broker-dealers typically send indications for institutional-size trades to their institutional clients through Bloomberg messages.

Over the past two years, broker-dealers are increasingly sending their indications to BondCliQ, a consolidated quote system that aggregates institutional pre-trade data. The BondCliQ system is the first to collect and organize corporate bond indications for redistribution into public subscribers, many of whom are dealers interested in knowing where their indications stand relative to those of other dealers. BondCliQ provided these data for this study.

Most pre-trade prices are indications, but broker-dealers generally honor their indications, especially if they are not too old. And with the advent of electronic systems, dealers posting firm quotes update them quickly in response to changing market conditions. They also increasingly update their indications as they see the quotes and indications of other dealers.

In contrast, equity markets produce much more public pre-trade price information than do bond markets. In the equity markets, exchanges—which account for a much more significant fraction of all trading than in the bond markets—arrange trades by matching orders sent to them. They publish the best bids and offers of displayed orders standing at their exchanges. The Securities Industry Automation Corporation (SIAC) and Nasdaq aggregate these exchange quotations to produce and publicly disseminate the NBBO (national best bid and offer) in real-time. No public quotation system exists in the U.S. bond markets, although private entities, such as BondCliQ, are building similar systems for the U.S. corporate bond market.

2   Research Design

This study identifies when current quoted prices displayed on the BondCliQ platform are better predictors of current trade prices than are last trade prices. The following paragraphs explain how the comparison method allows us to opine when different prices more accurately reflect security values.

Determining when quoted or last trade prices are more informative of values requires estimates of values to which the quoted and trade prices are compared. Since we never observe true current values,

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[2] TRACE makes the full sizes of truncated trades available to the public on a quarterly basis no sooner than six months after the trade. For example, on October 1st of this year, an enhanced historic TRACE data client would receive a file with the 2021 Q1 data.

we must estimate them. To avoid obvious biases, the estimates cannot depend on the quotes or trade prices to which the value estimates will be compared.

This study uses the prices of large customer trades to estimate values. As noted above, large institutional trades tend to be more informative of values than smaller trades. We focus on customer trades because investors are more interested in their trades than those between dealers. Similar results obtain when dealer traders are also analyzed.

Whenever a customer trade of $1 million in par value or more occurs, the trade price is compared to BondCliQ's standing quote mid-price (average of the quoted best bid and offer), if available, and the price of the last similarly valued trade.[3] The median absolute difference between the current quote midprice and the current large trade price is computed to measure the price informativeness of current quoted prices. A similar calculation is done for last trade prices whenever the current quote prices are available. A comparison of the two medians indicates when quoted prices are more informative than last trade prices. A smaller value indicates a more informative price.

The results are tabulated by the elapsed time since the last trade price. They are computed separately for par value prices and Treasury spread prices.

2.1   Data

2.1.1   Data Source
BondCliQ, an aggregator of broker-dealer and institutional-sized ATS bond quotes, provided the quotation data analyzed in this study. BondCliQ collects bid and ask prices expressed in both par value ("par value quotes") and spreads above the appropriate Treasury rate ("Treasury spread quotes"). Some broker-dealers provide quotes in both formats, while others provide only one format. BondCliQ anonymized the broker-dealer identities in the provided data using different identifiers for each broker-dealer every day.

BondCliQ also provided TRACE trade data that it obtains through a FINRA license. BondCliQ augmented these data with trade prices reported as spreads over the Treasury rate ("Treasury spread prices").

The sample period spans 18 months, from January 2020 to June 2021.

2.1.2   Trade Data Preparation
The study analyzes only trades executed during regular bond market trading hours (9:00 a.m. to 5:00 p.m. E.T. most days and 9:00 am to 1:00 pm on the day after Thanksgiving and Christmas Eve) on normal bond market trading days. The results thus exclude trades reported on weekends and bond market holidays.[4]

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[3] Analyses of trades larger than $0.1M in par value produced similar results.
[4] The excluded holidays are New Years, Martin Luther King Day, U.S. Presidents Day, Good Friday, Memorial Day, U.S. Independence Day, Labor Day, Thanksgiving, and Christmas.

The trade data include records of cancels and corrections reported to TRACE. The analysis excludes these records and all trades to which they point.

2.1.3 Computation of the Best Bid and Offer

The best bid and offer standing in the market at the time of every trade are computed as follows: For each security at the beginning of each day, all dealer quotes are set to missing. Whenever a broker-dealer quote arrives, it replaces the previous quote for that broker-dealer. If the quoted size is $1M or more in par value and the quote crosses the previous best bid or offer, all standing crossed quotes are removed on the assumption that they have become stale. The best bid and offer then are computed from all quotes for $1M or more in par value. The size threshold helps ensure that the quotes reflect information about potentially larger trades that tend to be more informative.

2.1.4 Additional data filters

Although CUSIPs should be unique security identifiers, some CUSIPs have records with more than one coupon or maturity date associated with them. Some of these records thus must have been incompletely coded or miscoded. Incomplete coding often occurs immediately after a bond is issued but before reference data about the bonds are widely available. Therefore, this study did not include any quote and trade data obtained from BondCliQ that had missing coupons and inconsistent maturity dates and coupons. In addition, if similar problems also appeared in the original TRACE trade data, these bonds were also excluded.

This study examines only securities with CUSIPs for which only one coupon and maturity date appear in the trade and quote data to minimize the potential for mismatching quotes for one security to trades of another security. Mismatches can significantly corrupt the results. For example, if quotes for one security were matched to the trades of another security, the quotes would not reflect trade values, which would bias the results toward the last trade prices. And if the trades of two or more securities were treated as those of a single security, the variation in prices would often reflect the prices of two different securities, which would bias the results toward quoted trade prices.

3 Results

Table 1 presents the median absolute differences of current trade prices from last trade prices and current quote prices for broker-dealer trades with customers of $1M or more in par value. Separate panels appear for investment-grade and high-yield bonds. The investment-grade results are reported in Treasury spread basis points, and the high-yield results in percentages of par value. The columns in each panel present medians classified by the time since the last trade, where days are trading days and not calendar days. The results are weighted by trade size so that a larger trade impacts the results more than does one of the more numerous smaller trades.

The last row of each panel presents the total number of trades analyzed. The totals decrease with the elapsed time between the current large trade and the last large trade: Most institutional customer trades are in securities for which large customer trades recently occurred.

The first row of each panel presents the median absolute differences of current trade prices from last trade prices (i.e., median absolute price changes). These median differences increase uniformly with the time elapsed since the last trade because values change more over longer than shorter intervals. These median differences also depend on the customer purchase and sales sequence because prices bounce between higher-priced customer purchases and lower-priced customer sales. Finally, the variation also depends on different prices that customers negotiate when buying and selling due to different trade sizes, differences in how informed dealers believe their clients are, and differences in how well clients negotiate their trade prices. Note that if values do not change between two successive trades of roughly equal size negotiated by clients perceived to be equally well informed, prices should not change much.

The second row of each panel presents the median absolute differences of current trade prices from contemporaneous quote mid-prices. These median differences do not increase with elapsed time since the last trade nearly as much as do the last trade price differences because both quoted prices reflect value changes that occur over time.

A comparison of the first and second rows of each panel reveals the main result of this study: quoted prices are better predictors of current trade prices than are last trade prices when the elapsed time between successive large trades is a day or more. Quoted prices incorporate more current value information than do last trade prices when values have changed.

The next row in each panel presents the percentage of trades for which the quote mid-price is closer to the trade price than is the last trade price. These percentages increase with elapsed time between the last trade and the current trade. For large trades occurring 20 or more days after the last large trade, the par value quote mid-price predicts the current trade price better than the last trade price for more than 90% of the trades. The rates are slightly lower for Treasury spread quote mid-prices because the spread-pricing convention removes value variation correlated with changes in the Treasury rate. These rates are lowest for investment-grade bonds because general interest rates are account for more variation in their values than for high-yield bonds.

Note that the quote mid-prices are closer to trade prices than last for more than 30% of large trades occurring less than 15 minutes after other large trades. Thus, although the last trade prices are more often closer than the quote mid-prices, the quotes often are informative even when the last trade occurred recently.

The second-to-last row presents median spreads to help better understand the above results. The spreads increase with the elapsed time since the last trade as uncertainty about values increases. The spreads are greater, and the increase is faster, for the high-yield bonds than for the investment-grade bonds because values are more volatile, and thus less certain, for high-yield bonds.

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[5] The average markups are computed separately for customer purchases and sales and for investment and high yield grade bonds.

Table 2 presents these results classified by the size of the current trade. The results are largely uniform across large trade sizes.

4   Discussion

This study demonstrates with simple methods that quoted bond prices provide information about current bond values. The information is beneficial for frequently traded bonds and increases in importance when the last trade price occurred a day or more before. These results show that anyone interested in current bond values will benefit from having access to quoted prices.

As bond markets continue to grow and expand, and as the use of automated technologies increases, access to consolidated pre-trade pricing information from quote platforms and electronic trading systems is growing in value. The increased availability of these data, and their increasing accuracy, will lower transaction costs and increase trading volumes and market liquidity. And greater quote accuracy will make the results documented in this study even more compelling.

Table 1

**Average Distances between Last Trade Prices and Current Best Quote Mid-Prices
from Current Trade Prices**

All trades are for $1 million in par value or more, and the best quotes are computed from all quotes for
$1 million par value or more. The sample spans January 2020-June 2021.

	Elapsed Time between Current and Last Trades									
	≤15 min	**15+ min to 1 hour**	**1+ to 3 hours**	**3+ to 12 hours**	**1 day**	**2 days**	**3-5 days**	**6-19 days**	**20 or more days**	**All Trades**
Panel A: Investment-Grade Bonds – Prices and Quotes in Treasury-Spreads (BPs)										
Median Absolute Differences (BP) between										
Current and Last Trade Price	1.10	1.30	1.44	1.53	1.90	2.57	3.48	5.60	16.41	1.51
Current Trade Price and Current Quote Mid-Price	1.89	1.74	1.75	1.82	1.81	1.96	2.25	2.50	2.81	1.83
Quote Mid-Price Is Closer than Last Trade Price	35%	41%	42%	44%	51%	58%	64%	69%	84%	44%
Median Treasury Spread Quoted Spread (BP)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	6.0	7.0	5.0
Number of Trades	42,100	40,689	40,953	19,328	51,014	5,329	3,778	2,801	1,931	207,923
Panel B: High-Yield Bonds –Prices and Quotes in Par Value (percentages of 100)										
Median Absolute Differences between										
Current and Last Trade Price	0.13	0.13	0.13	0.15	0.20	0.25	0.38	0.75	2.50	0.13
Current Trade Price and Current Quote Mid-Price	0.15	0.17	0.20	0.24	0.25	0.24	0.22	0.19	0.25	0.19
Quote Mid-Price Is Closer than Last Trade Price	33%	34%	33%	34%	41%	51%	66%	80%	91%	36%
Median Par Value Quoted Spread	0.50	0.50	0.64	0.75	0.75	0.75	0.68	0.75	0.75	0.52
Number of Trades	15,432	10,510	8,615	3,676	9,927	740	359	304	239	49,802

Table 2, Continued

Panel B: High-Yield Bonds –Prices and Quotes in Par Value (percentages of 100)

	Elapsed Time between Current and Last Trades									
Trade Size	≤15 min	15+ min to 1 hour	1+ to 3 hours	3+ to 12 hours	1 day	2 days	3-5 days	6-19 days	20 or more days	All Trades
Median Abs Difference between Current and Last Trade Price										
$1MM exactly	0.09	0.12	0.13	0.15	0.19	0.25	0.30	0.58	3.13	0.13
Marked 1MM+	0.13	0.13	0.13	0.15	0.20	0.25	0.38	0.75	2.46	0.13
Median Abs Difference between Current Trade Price and Current Quote Mid-Price										
$1MM exactly	0.15	0.15	0.19	0.23	0.25	0.23	0.25	0.25	0.25	0.18
Marked 1MM+	0.15	0.18	0.21	0.24	0.25	0.25	0.21	0.19	0.25	0.19
Quote Mid-Price Is Closer Than Last Trade Price (percent)										
$1MM exactly	32%	34%	34%	32%	40%	52%	64%	71%	90%	36%
Marked 1MM+	33%	34%	33%	34%	41%	51%	67%	81%	91%	36%
Median Par Value Quoted Spread										
$1MM exactly	0.46	0.50	0.50	0.75	0.75	0.75	0.70	0.92	0.75	0.50
Marked 1MM+	0.50	0.50	0.69	0.75	0.75	0.75	0.66	0.74	0.67	0.57
Number of Trades										
$1MM exactly	2,761	1,687	1,351	538	1,707	153	53	41	39	8,330
Marked 1MM+	12,671	8,823	7,264	3,138	8,220	587	306	263	200	41,472