

Corporate Bond Trading Costs During the Financial Crisis

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June 2010

Abstract

We exploit the addition of a direction of trade variable to FINRA's TRACE™ system to measure effective bid-ask spreads for corporate bonds. We find significantly larger spreads for smaller trades, lower quality bonds, longer duration bonds, and during the "crisis" period of late 2008 and early 2009. We find higher spreads than reported by other studies for earlier time periods. We also document a pairing of dealer-client and interdealer trades, suggesting that many client trades, especially smaller trades, are intermediated by a dealer who earns a spread for matching the client with the dealer who is the ultimate source of supply or demand.

Introduction

Whereas the study of the execution quality of equity trades has been facilitated by datasets such as the New York Stock Exchange's Trades and Quotes data, no comparable dataset exists for corporate bonds, which trade largely in a dealer market rather than on an exchange. From 2002-6, the TRACE reporting system began disclosing transaction prices, but no comparable publicly available dataset exists for quotes. In November 2008, TRACE added a "reporting party side" variable that discloses whether a trade involved a dealer that was purchasing from a non-dealer client (B), selling to a non-dealer client (S), or trading with another dealer (D). In this note, we exploit this variable to estimate effective bid-ask spreads.

We find spreads that are significantly larger than those estimated in past work, particularly during the last two months of 2008 and the first half of 2009. During our sample period, the median retail-sized trade (defined as under \$100,000 in face value) pays a two-way effective bid-ask spread of 152 basis points (bp), while the average institutionally-sized trade (greater than or equal to \$500,000 in face value) pays 31 bp. Mean spreads are 1.5-2 times larger than median spreads: 231 bp for retail-sized and 53 bp for institutionally-sized trades. Larger trading costs for smaller trades are also found for municipal and Treasury bonds (Chakravarty and Sarkar, 2003; Harris and Piwowar, 2006) but not equities (e.g., Lin, Sanger, and Booth, 1995).

The closest prior study to ours is Edwards, Harris, and Piwowar (2006), which estimates mean and median spreads for the TRACE sample as a parametric function of trade size.¹ Their estimated median two-way spreads from January 2003 to January 2005 range from 66-120 bp for retail-sized and 2-20 bp for institutionally-sized trades; for mean spreads the analogous ranges are 92-150 bp and 8-28 bp (see their Table IV). Our spreads for the time period November 2008 to April 2010, estimated using a similar method, are around twice as large. Even if we restrict attention to the second half of our sample, which had lower spreads than the crisis period at the beginning, we still find substantially higher trading costs than in 2003-5.

¹ Edwards, Harris, and Piwowar (2006) had access to a reporting party side variable in TRACE for their earlier time period. Goldstein, Hotchkiss, and Sirri (2006) also had access to this variable for their study of the BBB-rated corporate bonds that were added to TRACE in 2003 as part of a controlled experiment. Other work on corporate bond trading costs includes Hong and Warga (2000), Schultz (2001), Chakravarty and Sarkar (2003), and Bessembinder, Maxwell, and Venkataraman (2006). These papers use the National Association of Insurance Commissioners (NAIC) data on bond transactions by insurance companies. Bessembinder, Maxwell, and Venkataraman report that the NAIC data accounted for 12.5% of the dollar trading volume on TRACE in the second half of 2002 (p. 263). The studies on NAIC find smaller trading costs than reported by Edwards, Harris, and Piwowar, likely reflecting the exclusively institutional nature of their sample.

Methodology

In this note, we use a simple methodology for measuring effective bid-ask spreads, taking the difference between the (quantity-weighted) average dealer-client transaction price and the (quantity-weighted) average inter-dealer transaction price from that day. Most retail-sized dealer-client transactions are immediately preceded or followed by an inter-dealer transaction; for 81 percent of retail-sized trades this occurs within an hour and for 91 percent of retail-sized trades it occurs on the same day. For 74 percent of the cases with a same-day inter-dealer trade, there is an inter-dealer trade of exactly the same size as the dealer-client trade. This pairing of trades may be indicative of dealers with a client relationship, or membership in a syndicate with an exclusive right to handle order flow from a particular brokerage, matching client orders with the other dealer who is interested in taking the other side.

The pairing of institutionally-sized trades is less common. Forty seven percent of institutionally-sized trades are preceded or followed by inter-dealer trades within an hour and 69 percent by inter-dealer trades on the same trading day. Of the instances with a same-day inter-dealer trade, there is an inter-dealer trade matching in size in only 38 percent of cases.² Institutional clients should be able or willing to search more dealers making it more likely that their trade will be placed with a dealer most interested in taking the other side.

For the dealer-client trades that are not accompanied by an inter-dealer trade on the same day, we match the trade with the average inter-dealer price on the next day with an inter-dealer trade. This causes our estimate of effective spread to include market returns for the bond between the two trading days. To reduce the noise that this potentially introduces into our results, we adjust the future interdealer bond price for coupon interest and the intervening return in medium-term treasuries and the corporate bond market, as captured by exchange traded funds (IEF for treasuries, LQD for investment grade and JNK for high-yield bonds).³

² This 38 percent figure may be overstated due to the fact that TRACE truncates trade sizes at \$5,000,000 for investment grade and at \$1,000,000 for high-yield bonds. This would cause, for example, a \$6,000,000 and a \$7,000,000 trade to appear to be the same size in TRACE.

³ Edwards, Harris, and Piwowar (2006) identify trading costs using a regression that compares bond trading prices with subsequent trades of a different size or direction, adjusting as we do for coupon interest and intervening returns in bond market factors. The main difference is that they impose a functional form for the trading cost-trade size relationship, including imposing symmetry, whereas we allow for more flexibility.

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Results

Table 1 presents our estimates of one-way bid-ask spreads by trade size. Spreads are approximately symmetric for client buys and sells and decrease in trade size, with the sharpest drop occurring between \$100,000 and \$500,000 in size. Trades below \$100,000 in face value, which we refer to as retail-sized trades, have equal-weighted median two-way spreads of 152 bp; trades with \$500,000 or more in face value, which we refer to as institutionally-sized trades, have equal-weighted median two-way spreads of 31 bp. Trades in between these two sizes have equal-weighted median two-way spreads of 75 bp.

Table 1. Spreads by Trade Size

Trade size	Purchases by dealers			Sales by dealers			Two-way spread	
	Bond*days	Mean spread	Median spread	Bond*days	Mean spread	Median spread	Means	Medians
< 5k	139,860	-1.42	-0.84	128,991	0.93	0.63	2.36	1.47
5-9k	174,441	-1.17	-0.70	239,263	1.07	0.78	2.24	1.48
10-19k	260,540	-1.13	-0.73	407,543	1.19	0.93	2.32	1.65
20-49k	274,766	-1.02	-0.67	408,189	1.14	0.87	2.16	1.54
50-99k	145,377	-0.85	-0.55	221,710	0.97	0.67	1.82	1.22
100-199k	109,332	-0.64	-0.41	171,644	0.76	0.47	1.40	0.89
200-499k	87,495	-0.42	-0.27	129,078	0.53	0.29	0.96	0.55
500-999k	57,762	-0.29	-0.20	76,162	0.38	0.19	0.67	0.39
1M-1.9M	56,194	-0.21	-0.16	71,337	0.28	0.13	0.49	0.29
2M-4.9M	42,577	-0.21	-0.13	48,315	0.19	0.10	0.40	0.23
5M	16,166	-0.20	-0.14	16,621	0.12	0.06	0.32	0.20
1M+ (truncated)	47,699	-0.03	-0.18	47,461	0.45	0.16	0.49	0.33
5M+ (truncated)	32,479	-0.24	-0.14	29,101	0.11	0.06	0.35	0.20
All < \$100k	611,679	-1.17	-0.72	748,439	1.14	0.81	2.31	1.52
100-499k	177,097	-0.55	-0.35	251,791	0.68	0.40	1.23	0.75
> \$500k	202,989	-0.21	-0.17	222,132	0.32	0.14	0.53	0.31

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Table 2 examines the relationship between our estimate of spreads and the time delay between the dealer-client and the inter-dealer trade. For retail-sized trades, estimated spreads are larger for the trades that are not accompanied by an inter-dealer trade on the same day, while there is little difference for institutionally-sized trades. Higher spreads for retail-sized trades without an immediate inter-dealer trade may be due to dealers charging higher spreads when they cannot immediately find a dealer interested in offsetting the client trade. If clients making institutionally-sized trades are more likely to match with the dealer interested in ultimately holding the inventory, it might explain why we do not see a similar relationship for larger trades.⁴

Table 2. Estimated Median Spreads by Time to Next Interdealer Trade

In this table, spreads are calculated by matching dealer-client trades with the quantity-weighted average inter-dealer trade price on the trade date, or on the next day with an interdealer trade. In the latter case, future inter-dealer prices are adjusted for coupon interest and bond market movements, as proxied using the returns for an investment-grade and high-yield exchange traded fund (ticker symbols LQD and JNK, respectively).								
Days until interdealer trade	Retail-sized trades (under \$100k)				Institutionally-sized (\$500k or more)			
	Dealer buys	Dealer sells	Total	% of bond days	Dealer buys	Dealer sells	Total	% of bond days
Same day	-0.72	0.81	1.52	81.2	-0.17	0.14	0.31	63.3
1	-0.87	1.11	1.99	4.7	-0.11	0.17	0.28	8.5
2	-0.84	1.14	1.99	1.6	-0.09	0.20	0.28	3.0
3	-0.88	1.16	2.04	1.7	-0.10	0.16	0.26	3.0
4	-0.71	1.24	1.95	1.3	-0.05	0.22	0.27	2.6
5	-0.75	1.24	2.00	1.1	-0.04	0.25	0.29	2.2
6	-0.83	1.27	2.10	1.0	-0.03	0.22	0.24	2.0
7-13	-0.79	1.30	2.09	3.0	-0.03	0.26	0.29	6.2
More than 14	-0.62	1.54	2.17	4.5	0.19	0.44	0.25	9.2
All bond*days	-0.82	0.88	1.70	100.0	-0.19	0.15	0.34	100.0

⁴ Spreads do appear to be larger for dealer sells than for dealer buys for trades with a long delay until the next inter-dealer trade. This is likely due to future non-trading being correlated with negative idiosyncratic returns, which would cause dealer buys to appear to have smaller spreads (i.e., to be less profitable for the dealer) and sells to have larger spreads (i.e., to be more profitable).

WHITE PAPER (CONTINUED)

Table 3 examines trading costs for subsamples of our data. Both retail and institutional spreads are clearly wider for lower credit quality issues, with a significant difference between AAA and AA-rated debt. The AAA-AA dealer spread difference is most pronounced during the first five months of our sample (November 2008 to March 2009), and thus is likely related to the financial crisis creating uncertainty about all but the most highly rated debt. Dealer spreads are lower during the last half of our sample; spreads for institutionally-sized trades fall much more in proportional terms than they do for retail-sized trades. Spreads are wider for longer-dated bonds, as one might expect given that a given spread in bond prices implies a smaller difference in yield for a long-dated bond. Spreads are also slightly larger for smaller and less frequently traded issues, although these differences are less pronounced than the differences in spreads for large and small-capitalization equities.

Table 3. Median Spreads for Subsamples of the Data

This table reports median spreads, estimated as described in Table 2, for subsamples of bond*days. Figures exclude spread calculated using client and interdealer trades from different days, but the cross-sectional differences in medians spreads that include these trades are similar.							
	% of bond days	Retail-sized trades (under \$100k)			Institutionally-sized trades (\$500k or more)		
		Dealer buys	Dealer sells	Total spread	Dealer buys	Dealer sells	Total spread
By S&P® rating							
AAA	4%	-0.27	0.36	0.63	-0.06	0.16	0.22
AA	12%	-0.64	0.72	1.35	-0.16	0.31	0.47
A	39%	-0.67	0.86	1.53	-0.19	0.39	0.58
BBB	29%	-0.77	0.96	1.73	-0.16	0.50	0.66
BB	7%	-0.81	1.08	1.88	-0.29	0.53	0.82
B	6%	-0.78	1.07	1.86	-0.25	0.49	0.74
C or lower	3%	-0.93	1.23	2.28	-0.24	0.63	0.53
By quantity traded in prior calendar month							
Top decile	25%	-0.67	0.74	1.41	-0.15	0.12	0.27
2nd	19%	-0.67	0.74	1.41	-0.18	0.16	0.34
3rd	14%	-0.68	0.78	1.46	-0.21	0.19	0.40
4th	11%	-0.74	0.84	1.58	-0.21	0.21	0.42
5th	9%	-0.77	0.96	1.74	-0.25	0.24	0.49
Below median	22%	-0.61	0.99	1.61	-0.35	0.26	0.61
By maturity year							
2009	5%	-0.46	0.23	0.69	-0.15	0.11	0.26
2010-14	46%	-0.59	0.53	1.12	-0.17	0.12	0.30
2015-19	26%	-0.84	1.07	1.91	-0.25	0.14	0.39
2020-24	5%	-0.82	1.52	2.34	0.05	0.64	0.60
2025-29	6%	-0.88	1.95	2.83	-0.05	0.52	0.57
2030-34	4%	-0.90	2.07	2.96	-0.08	0.51	0.59
2005-39	7%	-0.81	2.07	2.88	-0.07	0.34	0.41
2040 and after	0.5%	-1.23	2.00	3.23	-0.32	0.36	0.68

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Table 3. Median Spreads for Subsamples of the Data *continued*

	% of bond days	Retail-sized trades (under \$100k)			Institutionally-sized trades (\$500k or more)		
		Dealer buys	Dealer sells	Total spread	Dealer buys	Dealer sells	Total spread
By bond type							
Corporate debenture	61%	-0.70	0.76	1.46	-0.21	0.13	0.34
Corporate medium-term note	11%	-0.65	0.65	1.30	-0.17	0.16	0.33
Retail note	21%	-0.75	1.11	1.86	Insufficient data		
Convertible	4%	-0.42	1.19	1.61	0.02	0.36	0.34
Other	2%	-0.75	1.10	1.85	-0.21	0.21	0.42
Age of bond							
First year since issue	8%	-0.57	0.69	1.26	-0.19	0.07	0.26
Second year	13%	-0.68	0.90	1.57	-0.18	0.15	0.34
Year 3 to 9	65%	-0.69	0.79	1.48	-0.18	0.17	0.35
Year 10+ since issue	14%	-0.66	0.89	1.55	-0.13	0.08	0.21
By amount outstanding							
Over \$1 billion	19%	-0.51	0.98	1.49	-0.25	0.22	0.47
\$100M - \$1B	56%	-0.74	1.11	1.85	-0.38	0.65	1.02
\$10M - \$100M	16%	-0.74	0.80	1.53	-0.23	0.18	0.40
Under \$10 Million	9%	-0.64	0.71	1.36	-0.14	0.12	0.26
By quarter							
2008Q4	8%	-1.03	0.87	1.90	-0.44	0.20	0.64
2009Q1	15%	-0.95	0.93	1.88	-0.38	0.15	0.53
2009Q2	16%	-0.91	0.87	1.79	-0.28	0.13	0.41
2009Q3	17%	-0.72	0.81	1.53	-0.15	0.15	0.30
2009Q4	15%	-0.56	0.76	1.32	-0.10	0.14	0.23
2010Q1	19%	-0.52	0.71	1.23	-0.09	0.12	0.21
2010Q2	10%	-0.48	0.65	1.14	-0.08	0.12	0.20

Table 4 presents estimates of spreads for 25 individual issues with high ex-ante expected trading volume.⁵ Spreads for retail-sized trades are consistently and significantly larger than those for institutionally-sized trades for all 25 issues. As in Table 3, spreads are larger for lower credit quality and long-dated issues. The overall median spread from these 25 heavily traded bonds is actually slightly larger than the median spread for the entire sample.

⁵ We select 25 bonds with the highest number of trades reported in TRACE from January 2008 to October 2008. We limit consideration to corporate bonds and medium-term notes, include only the most heavily traded bond from each issuer (or successor firm where the original issuer has been acquired) and exclude Lehman Brothers, which filed for bankruptcy protection before our sample began.

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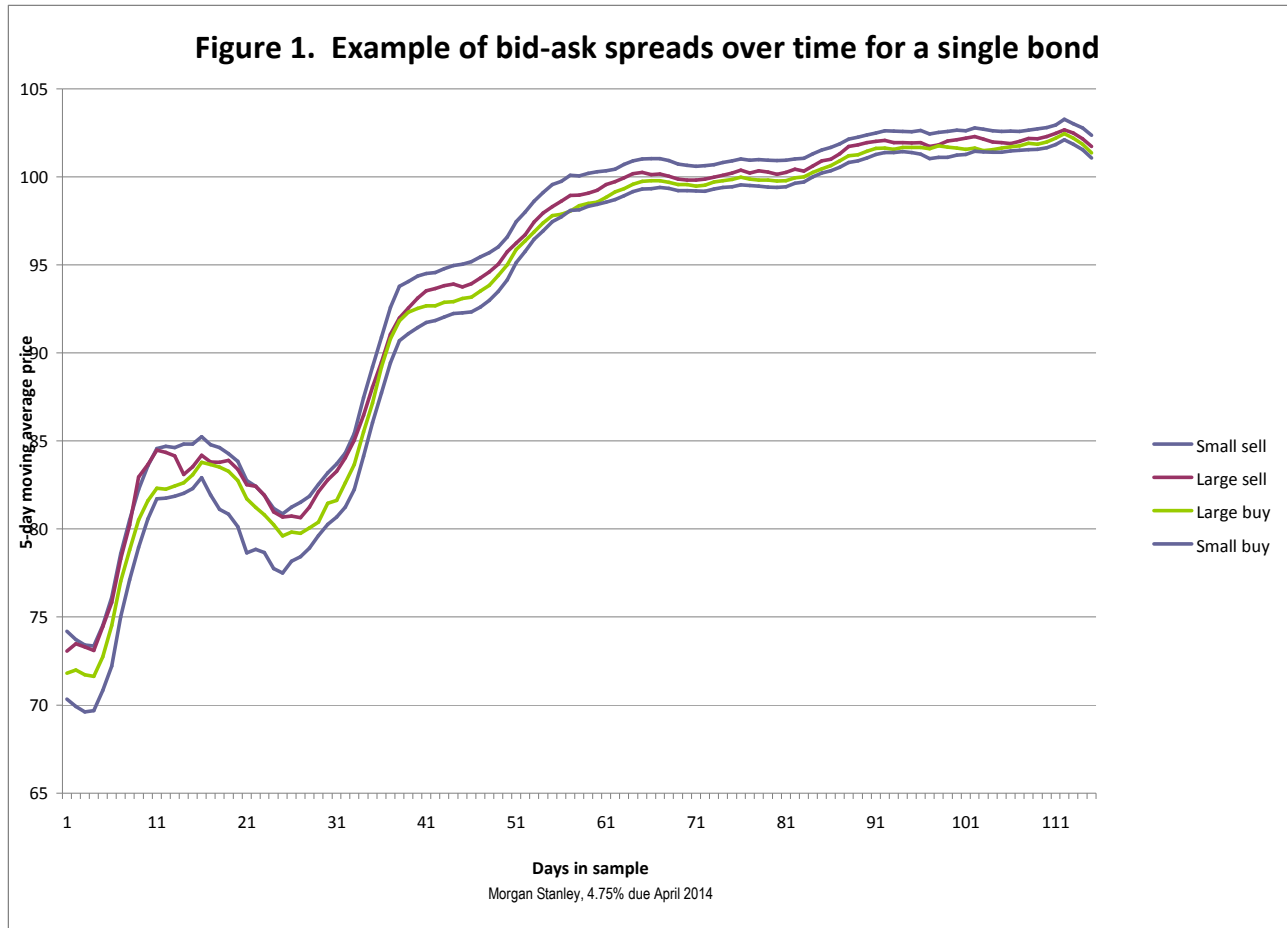
Table 4. Retail and Institutional Spreads for 25 Heavily Traded Bonds

Issuer	S&P rating	CUSIP	Maturity	Coupon	Retail-sized trades (less than \$100,000)			Institutionally-sized trades (\$500,000 or more)		
					Dealer buys	Dealer sells	Total spread	Dealer buys	Dealer sells	Total spread
General Electric	AA+	369604BC6	Dec-17	5.25	-0.96	1.24	2.21	-0.38	0.20	0.57
GE Capital	AA+	36962GY4	Jun-12	6	-0.75	0.60	1.34	-0.20	0.17	0.37
Walmart	AA	931142CK7	Aug-37	6.5	-0.93	2.00	2.93	-0.18	0.21	0.39
Pfizer*	AA	983024AE0	Feb-14	5.5	-0.71	0.64	1.34	-0.14	0.16	0.30
Cisco	A+	17275RAC6	Feb-16	5.5	-0.69	0.63	1.32	-0.29	0.13	0.41
JP Morgan Chase	A+	46625HHF0	May-38	6.4	-0.54	2.71	3.25	-0.34	0.30	0.64
Verizon	A	92344RAA0	Sep-11	6.5	-0.97	0.58	1.55	-0.38	0.13	0.52
Disney	A	25468PBX3	Mar-12	6.375	-0.91	0.51	1.42	-0.22	0.05	0.27
AT&T	A	00206RAG7	Jan-38	6.3	-0.81	2.36	3.17	-0.20	0.09	0.29
HSBC*	A	441812JW5	Oct-11	6.375	-0.78	0.68	1.46	-0.24	0.39	0.63
Goldman Sachs	A	38141GAZ7	Jan-11	6.875	-0.71	0.43	1.15	-0.23	0.17	0.40
Bank of America*	A	59018YJ36	Aug-12	6.05	-1.05	0.86	1.91	-0.22	0.20	0.43
Pepsico	A-	713448BG2	Feb-13	4.65	-0.65	0.48	1.13	-0.31	0.19	0.50
Citigroup	A-	172967CQ2	Sep-14	5	-1.73	1.39	3.13	-0.34	0.43	0.77
Morgan Stanley	A-	61748AAE6	Apr-14	4.75	-1.48	1.17	2.65	-0.31	0.19	0.49
American Express	BBB+	0258M0CY3	Aug-13	7.3	-0.98	0.81	1.80	-0.31	0.22	0.53
Home Depot	BBB+	437076AR3	Dec-13	5.25	-0.79	0.75	1.54	-0.25	0.06	0.32
Vale Overseas	BBB+	91911TAH6	Nov-36	6.875	-1.04	1.20	2.24	-0.02	0.21	0.23
Capital One	BBB	14040HAQ8	Sep-11	5.7	-1.30	0.76	2.06	-0.09	0.71	0.80
Petrobras	BBB-	71645WAM3	Mar-18	5.875	-0.44	1.21	1.65	-0.18	0.01	0.19
Kraft Foods	BBB-	50075NAB0	Nov-11	5.625	-0.52	0.38	0.90	-0.16	0.12	0.28
Ford Motor Co. Credit	B-	345397TY9	Oct-11	7.25	-1.38	1.36	2.74	-0.06	0.41	0.47
Ford Motor Company	CCC	345370CA6	Jul-31	7.45	-2.22	2.99	5.21	-0.21	1.28	1.49
GMAC	NR	370425RP7	Jan-10	7.75	-0.85	0.70	1.55	-0.01	0.55	0.56
General Motors	NR	370442BB0	Jan-11	7.2	-4.88	6.75	11.63	-2.24	2.49	4.74
Median spread for 25					-0.89	0.81	1.70	-0.21	0.21	0.42
Median spread for full sample					-0.72	0.81	1.52	-0.17	0.14	0.31

* Bonds listed were originally issued by Wyeth, Household Finance, and Merrill Lynch, respectively.

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Figure 1 highlights a single bond that exemplifies some of the results mentioned above. Spreads are consistently wider for small trades than for larger trades. Both small and large-trade spreads are wider during the beginning of the sample, when the bond traded at lower price levels.



Conclusions

The November 2008 introduction of a variable identifying the side taken by dealers dramatically increased the value of the public TRACE data for understanding execution quality in the corporate bond market. We use this variable to calculate effective bid-ask spreads, and find that spreads are significantly larger for retail-sized trades than for institutionally-sized trades and are larger than those reported for earlier time periods.

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