

Internet Appendix for:
"Providing Liquidity in an Illiquid Market: Dealer Behavior
in U.S. Corporate Bonds"

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This document contains tables that show the results of additional analyses and robustness checks discussed but not included in the paper. The tables included in this appendix are as follows:

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Table IA.1

Stability of trading activity deciles

Table reports the frequency distribution of bonds moving from deciles of trading activity in the prior period (shown in columns) to deciles in the current period (shown in rows). Rows sum to 100 percent. The "no trade" group includes observations with no trading in the current or prior period. Percentages include all sample bond-year or bond-month observations excluding periods within six months of issuance, maturity, or redemption. Deciles are determined by ranking the median trading activity of the bond in a given period.

		Median trading activity decile by year							Median trading activity decile by month						
		<i>Decile in the prior period</i>								<i>Decile in the prior period</i>					
Trade count deciles:		No trades	1	2	3	4	5	6-10	No trades	1	2	3	4	5	6-10
<i>Decile in the current period:</i>	No trades	71.1	25.0	2.4	0.9	0.4	0.2	0.1	82.7	16.6	0.6	0.1	0.0	0.0	0.0
	1	7.3	85.4	6.3	0.7	0.2	0.1	0.1	21.8	65.0	11.0	1.8	0.3	0.1	0.1
	2	2.1	32.1	46.2	16.2	2.6	0.6	0.2	3.4	38.0	37.7	16.4	3.5	0.7	0.3
	3	1.6	9.3	26.6	39.5	17.5	4.0	1.4	1.5	11.8	29.1	35.6	16.6	4.1	1.3
	4	1.4	4.2	10.6	23.8	33.3	19.2	7.5	1.1	3.8	10.8	27.7	33.6	17.7	5.4
	5	1.2	2.8	4.3	11.7	20.8	31.6	27.7	1.1	1.9	3.5	10.1	24.5	35.6	23.4
	6-10	1.4	1.3	2.0	3.7	6.3	12.0	73.5	1.0	0.7	1.1	2.0	4.2	11.4	79.7
Days traded deciles:		No trades	1	2	3	4	5	6-10	No trades	1	2	3	4	5	6-10
<i>Decile in the current period:</i>	No trades	71.1	24.7	2.7	0.8	0.4	0.1	0.1	82.3	16.9	0.4	0.0	0.0	0.0	0.4
	1	7.5	85.5	6.3	0.5	0.2	0.0	0.1	22.6	64.6	11.2	1.3	0.3	0.0	0.1
	2	1.7	27.8	51.3	14.8	3.4	0.4	0.5	2.5	35.7	41.2	13.9	5.4	0.7	0.7
	3	1.3	6.4	29.5	34.4	23.0	2.7	2.7	1.2	9.9	33.9	26.9	19.7	3.7	4.7
	4	1.3	2.6	11.5	22.0	36.1	12.6	14.0	1.3	3.1	15.8	23.4	29.7	9.0	17.7
	5	1.4	1.8	5.0	9.1	24.3	17.3	41.1	3.9	1.2	6.1	13.0	26.4	11.6	37.8
	6-10	1.4	1.0	1.7	3.0	8.9	7.5	76.4	3.6	0.7	1.8	4.0	12.1	8.7	69.1

Table IA.2

Comparison of dealer roundtrip volume and trade count to all TRACE reported trades

The volume and number of trades that are part of a dealer roundtrip are compared to all TRACE reported trades in the same set of bonds. The sample consists of 55,988 bonds for which at least one roundtrip is identified. Statistics are also reported for the dataset deleting all dealer buys of less than 100 bonds.

All trades on TRACE

Total \$ volume of trades that are part of a dealer roundtrip	54,672,244,140
Total # trades that are part of a dealer roundtrip	59,513,429
Total \$ volume of trades that are part of a dealer roundtrip completed same day	12,968,980,709
Total # of trades that are part of a dealer roundtrip completed same day	17,942,690
Total \$ volume reported on TRACE	57,953,409,971
Total # of trades reported on TRACE	63,864,204
All dealer roundtrip trades as percentage of total TRACE volume	94.3%
All dealer roundtrip trades as percentage of total number of TRACE trades	93.2%
Same day roundtrips as percentage of total TRACE volume	22.4%
Same day roundtrips as percentage of total number of TRACE trades	28.1%

All trades on TRACE excluding buys < 100 bonds

Total \$ volume of trades that are part of a dealer roundtrip	53,807,340,724
Total # trades that are part of a dealer roundtrip	21,401,029
Total \$ volume of trades that are part of a dealer roundtrip completed same day	12,698,666,257
Total # of trades that are part of a dealer roundtrip completed same day	6,998,849
Total \$ volume reported on TRACE	57,026,177,683
Total # of trades reported on TRACE	23,002,055
All dealer roundtrip trades as percentage of total TRACE volume	94.4%
All dealer roundtrip trades as percentage of total number of TRACE trades	93.0%
Same day roundtrips as percentage of total TRACE volume	22.3%
Same day roundtrips as percentage of total number of TRACE trades	30.4%

Table IA.3A

Summary description of dealer roundtrips: roundtrips starting from small buy trades

Characteristics of dealer roundtrips starting from a buy trade of less than 100 bonds. Variables are as defined in Appendix Table A1. Paired roundtrips are defined as a pair of trades where a given dealer buys and sells the same quantity of the same bond on the same day. Roundtrips completed in more than one day match each dealer buy of a given bond with one or more subsequent sell trades by that dealer in the same bond up to the face amount of the initial buy trade, using sell trades that occur within 60 days. Roundtrips which include any agency trades are excluded.

	All roundtrips (n=18,804,643)		Paired roundtrips (n=9,670,872; 51.4%)		Other same-day roundtrips (n=2,185,768; 11.6%)		Roundtrips completed in more than one day (n=6,948,003; 36.9%)	
	<u>Mean</u>	<u>Median</u>	<u>Mean</u>	<u>Median</u>	<u>Mean</u>	<u>Median</u>	<u>Mean</u>	<u>Median</u>
Weighted avg holding period	9.0	1.0	1.0	1.0	1.0	1.0	22.7	18.7
Length of holding period	9.8	1.0	1.0	1.0	1.0	1.0	24.9	22.0
Time to last sell (seconds)	763,196	1,695	806	2	6,889	4,560	2,062,287	1,796,156
# sells in the roundtrip	1.22	1.00	1.00	1.00	1.40	1.00	1.46	1.00
Avg buy trade volume	22	15	22	15	23	15	21	15
Avg sell trade volume	337	25	22	15	366	43	768	68

Table IA.3B

Weighted average spreads by credit rating and trading activity deciles: roundtrips starting from small buy trades

The table reports the median weighted average spread for dealer roundtrips starting from a buy trade of less than 100 bonds. Variable definitions are provided in Appendix Table A1. Reported spreads in this table exclude roundtrips with dealer buy transactions of less than 100 bonds. Spreads are reported for deciles of roundtrips based on trading activity variables in the 30 day period preceding the dealer buy transaction, where decile 1 is the lowest trading activity level group.

		All roundtrips (n=18,804,643)	A and above (n=9,966,888)	BBB (n=4,627,186)	BB (n=1,671,372)	B and lower (n=2,539,197)
Trading activity decile:	High and low of trading activity variable within decile	Median spread	Median spread	Median spread	Median spread	Median spread
All		0.550	0.500	0.738	0.750	0.638
Trade count						
1	0 - 16	0.750	0.800	0.750	0.656	0.500
2	17 - 38	0.747	0.750	0.750	0.750	0.550
3	39 - 69	0.660	0.600	0.721	0.790	0.625
4	70 - 114	0.582	0.500	0.699	0.870	0.680
5	115 - 179	0.500	0.394	0.660	0.899	0.700
6-10	180 - 16,772	0.500	0.399	0.750	0.750	0.700
Days traded						
1	0 - 6	0.750	0.762	0.743	0.633	0.500
2	7 - 11	0.741	0.750	0.750	0.750	0.500
3	12 - 15	0.667	0.625	0.727	0.776	0.550
4	16 - 18	0.589	0.500	0.700	0.830	0.655
5	19 - 19	0.500	0.400	0.715	0.800	0.700
6-10	20 - 22	0.500	0.399	0.744	0.750	0.750

Table IA.3C

Weighted average spreads by roundtrip type and counterparty type: roundtrips starting from small buy trades

The table reports the median weighted average spread for dealer roundtrips starting from a buy trade of less than 100 bonds. Variable definitions are provided in Appendix Table A1. Reported spreads in this table exclude roundtrips with dealer buy transactions of less than 100 bonds.

	All roundtrips	Paired roundtrips		Other same-day roundtrips			Roundtrips completed in more than one day					
		all	sell to customer	sell to dealer	all	sell to customer	sell to customer & dealer	sell to dealer	all	sell to customer	sell to customer & dealer	sell to dealer
All dealer buys	0.55 (18,804,643)	0.43 (9,670,872)	0.75 46.1%	0.20 53.9%	0.76 (2,185,768)	1.29 48.9%	0.86 6.2%	0.55 44.9%	0.88 (6,948,003)	1.04 43.8%	0.88 23.6%	0.77 32.7%
Buy from customer	0.75 (6,891,472)	0.50 (3,033,213)	1.70 46.1%	0.40 53.9%	1.00 (1,104,886)	2.00 48.9%	1.25 6.2%	0.50 44.9%	1.18 (2,753,373)	1.50 43.8%	1.27 23.6%	0.88 32.7%
Buy from dealer	0.50 (11,913,171)	0.40 (6,637,659)	0.64 46.1%	0.05 53.9%	0.67 (1,080,882)	0.80 48.9%	0.56 6.2%	0.60 44.9%	0.70 (4,194,630)	0.62 43.8%	0.56 23.6%	0.75 32.7%

Table IA.4

Roundtrip completion for top ten (volume) dealers versus others

The table reports the percentage of roundtrips by trading activity deciles which are paired roundtrips, other same day roundtrips, and roundtrips completed in more than one day. Statistics are reported by trading activity deciles for subgroups of roundtrips by top ten (volume) and other dealers. All variables are as defined in Appendix Table A1. The table includes all roundtrips starting from a dealer buy of at least 100 bonds and excludes roundtrips that include any agency trades.

		Top ten dealer (volume)				Other dealers			
		Percent of total roundtrips		Weighted avg holding period for roundtrips completed in more than one day (median days)		Percent of total roundtrips		Weighted avg holding period for roundtrips completed in more than one day (median days)	
		Paired roundtrips	Other same day roundtrips	Roundtrips completed in more than one day		Paired roundtrips	Other same day roundtrips	Roundtrips completed in more than one day	
Trade count deciles:									
	1	37.8%	12.6%	49.6%	21.3	68.0%	11.4%	20.6%	8.0
	2	31.7%	14.6%	53.8%	22.7	60.5%	12.8%	26.7%	11.0
	3	30.9%	15.9%	53.2%	23.0	57.8%	13.8%	28.3%	13.6
	4	31.2%	16.8%	52.0%	23.0	56.2%	15.0%	28.8%	15.0
	5	31.5%	17.3%	51.2%	23.1	54.8%	15.8%	29.4%	16.7
	6-10	32.9%	20.1%	46.9%	22.1	49.9%	19.6%	30.5%	17.9
Days traded deciles:									
	1	41.3%	13.0%	45.6%	20.2	67.6%	12.2%	20.3%	7.0
	2	33.1%	14.7%	52.2%	22.0	61.5%	13.4%	25.1%	10.0
	3	31.9%	16.2%	51.9%	22.8	58.6%	14.5%	26.9%	13.0
	4	32.1%	17.5%	50.3%	23.0	56.4%	16.2%	27.4%	15.0
	5	33.1%	19.2%	47.7%	23.9	55.2%	18.3%	26.5%	18.0
	6-10	31.0%	18.9%	50.1%	22.9	49.2%	18.4%	32.4%	18.0

Table IA.5

Endogenous Switching Regression Model: Comparisons for Decile 1

The table reports the results of the two stage endogenous switching regression model. Panel A provides comparison of decile 1 to all other deciles (2-10, the omitted group). Panel B omits deciles 6-10 and provides comparison of decile 1 to deciles 2-5 (the omitted group). Coefficients for additional included variables from the base specification (Tables 7 and 8) are not reported for brevity. *, **, and *** denote statistical significance at the 0.10, 0.05, and 0.01 level, respectively. Second stage regressions include quarter fixed effects. Robust standard errors clustered by issuer are shown in parentheses.

	Stage 1: Selection Equation (Probit)				Stage 2: Spread Model							
	A & above	BBB	BB	B & below	A & above		BBB		BB		B & below	
					same day	> 1 day	same day	> 1 day	same day	> 1 day	same day	> 1 day
<i>A. Sample includes all trade count deciles</i>												
Decile 1 (trade count)	0.1679*** (0.020)	0.1704*** (0.016)	0.2319*** (0.019)	0.1582*** (0.016)	0.0856*** (0.008)	0.1193*** (0.019)	0.0673*** (0.007)	0.0874*** (0.018)	0.0477** (0.024)	0.1371*** (0.028)	0.0653*** (0.006)	0.0119 (0.029)
Inverse Mills ratio					0.4920*** (0.017)	0.0443 (0.035)	0.3440*** (0.050)	-0.0734 (0.052)	0.139 (0.172)	-0.1020** (0.052)	0.0896*** (0.013)	-0.1100* (0.058)
Observed minus predicted from > 1 day					-0.092		-0.182		-0.035		-0.089	
Observed minus predicted from same day						-0.033		0.041		-0.038		0.067
Observations	1,374,972	955,421	511,009	1,258,738		1,374,972		955,421		511,009		1,258,738
<i>B. Sample omits trade count deciles 6-10</i>												
Decile 1 (trade count)	0.2460*** (0.015)	0.2522*** (0.016)	0.3203*** (0.018)	0.2771*** (0.017)	0.1131*** (0.008)	0.1608*** (0.021)	0.1036*** (0.008)	0.1201*** (0.025)	0.0787*** (0.015)	0.1579*** (0.038)	0.0607*** (0.006)	0.0399 (0.031)
Inverse Mills ratio					0.5030*** (0.012)	0.0372* (0.022)	0.4410*** (0.033)	-0.0766* (0.046)	0.2980*** (0.095)	-0.1070* (0.066)	0.0847*** (0.009)	-0.2010*** (0.066)
Observed minus predicted from > 1 day						-0.133		-0.247		-0.066		-0.097
Observed minus predicted from same day					-0.009		0.087		0.009		0.099	
Observations	2,915,822	1,813,435	809,892	2,040,304		2,915,822		1,813,435		809,892		2,040,304

Table IA.6Endogenous Switching Regression Model Excluding Roundtrips of *Top Ten: Volume* Dealers

The table reports the results of the two stage endogenous switching regression model. Coefficients are reported for trading activity deciles; coefficients for additional included variables from the base specification (Tables 7 and 8) are not reported for brevity. Variables are as defined in Appendix Table A1. *, **, and *** denote statistical significance at the 0.10, 0.05, and 0.01 level, respectively. Regressions include quarter fixed effects. Robust standard errors clustered by issuer are shown in parentheses.

A. Deciles based on trade count

	Stage 1: Selection Equation (Probit)				Stage 2: Spread Model							
	A & above	BBB	BB	B & below	A & above		BBB		BB		B & below	
					same day	> 1 day	same day	> 1 day	same day	> 1 day	same day	> 1 day
Observations	2,066,157	1,174,222	457,891	1,175,389	2,066,157		1,174,222		457,891		1,175,389	
Decile 1	0.1510*** (0.023)	0.1906*** (0.031)	0.3774*** (0.033)	0.1737*** (0.035)	0.0820*** (0.015)	0.2341*** (0.037)	0.0589*** (0.020)	-0.0093 (0.069)	0.0241 (0.041)	-0.0365 (0.098)	0.0153 (0.013)	-0.1645** (0.075)
Decile 2	0.0139 (0.018)	0.0164 (0.024)	0.1528*** (0.022)	-0.0052 (0.029)	0.0056 (0.013)	0.1284*** (0.030)	-0.0226 (0.017)	-0.1197* (0.064)	-0.0260 (0.024)	-0.1561* (0.081)	-0.0339*** (0.010)	-0.2176*** (0.064)
Decile 3	-0.0213 (0.014)	-0.0389* (0.021)	0.0526*** (0.020)	-0.0475* (0.025)	-0.0197* (0.011)	0.0337 (0.026)	-0.0480*** (0.014)	-0.1681*** (0.057)	-0.0389** (0.019)	-0.1740** (0.072)	-0.0400*** (0.008)	-0.2009*** (0.059)
Decile 4	-0.0290** (0.012)	-0.0450*** (0.017)	0.0119 (0.018)	-0.0472** (0.021)	-0.0308*** (0.008)	-0.0087 (0.020)	-0.0514*** (0.012)	-0.1658*** (0.050)	-0.0379** (0.016)	-0.1317** (0.066)	-0.0276*** (0.007)	-0.1106* (0.057)
Decile 5	-0.0317*** (0.010)	-0.0416*** (0.013)	0.0054 (0.016)	-0.0465*** (0.017)	-0.0318*** (0.006)	-0.0176 (0.015)	-0.0507*** (0.010)	-0.1475*** (0.042)	-0.0345** (0.015)	-0.1068* (0.064)	-0.0185*** (0.006)	-0.1220*** (0.046)
Top ten dealer: trade count	0.1672*** (0.025)	0.0716*** (0.026)	-0.1360*** (0.041)	-0.0544 (0.039)	0.1258*** (0.009)	0.2274*** (0.018)	0.0526*** (0.016)	0.2442*** (0.018)	0.0256 (0.044)	0.2029*** (0.036)	0.0603** (0.025)	0.2046*** (0.036)
Eigenvector centrality	-19.1561*** (0.337)	-17.3917*** (0.401)	-9.2402*** (0.467)	-7.5315*** (0.313)	-5.5233*** (0.196)	-0.9627** (0.455)	-4.5576*** (0.298)	-2.3420*** (0.727)	-1.4597* (0.871)	0.7211 (0.693)	-0.7983*** (0.205)	-1.6101*** (0.523)
Dealer takes inventory (this bond)	-1.5464*** (0.030)	-1.5393*** (0.067)	-1.7153*** (0.064)	-1.7809*** (0.040)								
Dealer traded in prior year (this bond)	-0.0014*** (0.000)	-0.0021*** (0.000)	-0.0039*** (0.001)	-0.0037*** (0.000)								
Inverse Mills ratio					0.479 0.0109***	0.0545 0.0257**	0.446 0.0258***	-0.0259 0.0444	0.263 0.1510*	-0.00240 0.0762	0.137 0.0203***	-0.207 0.0458***
Observed minus predicted from > 1 day					-0.135		-0.242		-0.057		-0.089	
Observed minus predicted from same day						-0.005		0.090		0.019		0.133

Table IA.6 (continued)

B. Deciles based on days traded

	Stage 1: Selection Equation (Probit)				Stage 2: Spread Model							
	A & above	BBB	BB	B & below	A & above		BBB		BB		B & below	
					same-day	> 1 day	same-day	> 1 day	same-day	> 1 day	same-day	> 1 day
Observations	2,066,157	1,174,222	457,891	1,175,389	2,066,157		1,174,222		457,891		1,175,389	
Decile 1	0.3600*** (0.021)	0.3854*** (0.029)	0.5131*** (0.025)	0.4579*** (0.025)	0.2051*** (0.013)	0.3257*** (0.036)	0.1626*** (0.017)	0.2241*** (0.064)	0.1022*** (0.039)	0.2095** (0.096)	0.1039*** (0.013)	0.2127*** (0.065)
Decile 2	0.1632*** (0.016)	0.1922*** (0.023)	0.2463*** (0.020)	0.1820*** (0.019)	0.0979*** (0.010)	0.2126*** (0.026)	0.0623*** (0.015)	0.0623 (0.058)	0.0326 (0.021)	0.0224 (0.066)	0.0220** (0.009)	0.0520 (0.054)
Decile 3	0.1169*** (0.013)	0.1122*** (0.019)	0.1399*** (0.015)	0.1016*** (0.016)	0.0534*** (0.009)	0.0869*** (0.023)	0.0245** (0.012)	-0.0285 (0.048)	0.0037 (0.017)	-0.0208 (0.057)	0.0002 (0.007)	0.0533 (0.050)
Decile 4	0.1112*** (0.009)	0.0970** (0.012)	0.0930*** (0.012)	0.0751*** (0.013)	0.0340*** (0.006)	0.0297** (0.015)	0.0118 (0.010)	-0.0355 (0.044)	0.0011 (0.013)	-0.0369 (0.056)	-0.0029 (0.006)	0.0268 (0.045)
Decile 5	0.1657*** (0.008)	0.1354*** (0.011)	0.1010*** (0.012)	0.0762*** (0.010)	0.0382*** (0.003)	0.0117 (0.008)	0.0304*** (0.006)	0.0243 (0.035)	0.0089 (0.011)	-0.0278 (0.036)	0.0052 (0.003)	0.0594 (0.040)
Top ten dealer: trade count	0.1655*** (0.025)	0.0690*** (0.026)	-0.1373*** (0.040)	-0.0538 (0.039)	0.1262*** (0.010)	0.2285*** (0.018)	0.0534*** (0.016)	0.2452*** (0.018)	0.0255 (0.039)	0.2068*** (0.036)	0.0622** (0.025)	0.2102*** (0.037)
Eigenvector centrality	-19.2388*** (0.335)	-17.4740*** (0.405)	-9.2644*** (0.468)	-7.6067*** (0.310)	-5.5118*** (0.194)	-1.0147** (0.458)	-4.5506*** (0.302)	-2.4276*** (0.747)	-1.5229** (0.707)	0.7166 (0.713)	-0.8102*** (0.206)	-1.7419*** (0.525)
Dealer takes inventory (this bond)	-1.5479*** (0.029)	-1.5431*** (0.067)	-1.7179*** (0.064)	-1.7904*** (0.039)								
Dealer traded in prior year (this bond)	-0.0013*** (0.000)	-0.0019*** (0.000)	-0.0038*** (0.000)	-0.0035*** (0.000)								
Inverse Mills ratio					0.4780*** (0.011)	0.0510** (0.026)	0.4440*** (0.026)	-0.0239 (0.045)	0.273** (0.119)	0.00218 (0.076)	0.1400*** (0.020)	-0.2020*** (0.046)
Observed minus predicted from > 1 day					-0.137		-0.243		-0.060		-0.094	
Observed minus predicted from same-day						-0.004		0.090		0.019		0.134

Table IA.7

Endogenous Switching Regression Model: Impact of Dissemination Under TRACE

The sample includes all observations of dealer roundtrips from September 2003 to September 2004 (the pre-dissemination period) and February 2006 to February 2007 ("post" period). The period between is omitted due to the phase in of dissemination, under which trade information for less actively traded bonds is subject to delays (see timeline in Goldstein and Hotchkiss, 2009). Results are reported for bonds rated B and below. Additional control variables, not reported, are as included in Tables 7 and 8. Disseminated refers to the non-144A bonds which become disseminated in the post period.

	Stage 1: Selection	Stage 2: Spread model	
	eqn (Probit)	same-day	> 1 day
Observations	553,826	553,826	
Decile 1	-0.0217 (0.036)	0.0486*** (0.017)	0.1087 (0.134)
Decile 2	-0.1823*** (0.031)	-0.0560*** (0.012)	-0.1302 (0.110)
Decile 3	-0.1696*** (0.029)	-0.0595*** (0.010)	-0.1201 (0.105)
Decile 4	-0.1204*** (0.025)	-0.0481*** (0.010)	-0.1071 (0.099)
Decile 5	-0.1073*** (0.023)	-0.0298*** (0.008)	-0.1639** (0.083)
Disseminated	-0.0466* (0.027)	0.0168 (0.014)	0.1949 (0.177)
Post	0.0891*** (0.028)	-0.0841*** (0.013)	0.3358 (0.213)
Disseminated*post	0.0208 (0.034)	-0.0346** (0.015)	-0.1480 (0.186)
Disseminated * post * decile 1	-0.1039*** (0.028)	-0.1403*** (0.013)	-0.5247*** (0.120)
Inverse Mills ratio		0.0712*** (0.009)	0.0116 (0.088)
Observed minus predicted from > 1 day		-0.242	
Observed minus predicted from same day			0.157