

## The Bond Market: Where the Customers Still Have No Yachts

*Quantifying the markup paid by retail investors in the bond market.*

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### **Abstract:**

Relative to institutional investors, retail bond investors pay significantly higher prices and receive significantly less proceeds, respectively, when buying and selling the same individual corporate bonds as institutional investors. We estimate that this retail markup costs retail bond investors 65 basis points in incremental round-trip trading costs on the average corporate bond, with the retail markup varying significantly based upon the effective duration of the underlying bond being traded, the option-adjusted spread of the bond (“OAS”) and the volume traded for the specific security. This retail markup represents a significant trading cost for retail investors that should result in lower realized performance for the average retail bond investor.

### **Summary of Research Findings:**

We examined trades in SEC-registered, US Dollar-denominated investment grade corporate bonds as reported to FINRA’s TRACE (Transaction Reporting and Compliance Engine) database for calendar year 2010. We sorted the reported trades into two categories based on trade size to determine whether or not retail investors were receiving equivalent execution to institutional investors when trading in the same corporate bonds. We then calculated a volume-weighted average price (“VWAP”) for each day’s reported bond purchases and sales by trade size category and calculated the average spread between VWAP’s of the two trade-size categories.

The data suggests that retail bond investors incur a significant markup relative to institutional investors when buying or selling individual corporate bonds (throughout this paper, we use the term “retail markup” to refer both to the markup retail investors pay when purchasing bonds and the markdown they receive when selling bonds). For any given individual bond, the size of the retail markup is directly correlated with (1) the effective duration of the bond, (2) the OAS of the bond and (3) the total volume traded for the bond on any given day.

In a cross sectional regression of retail markup on effective duration, we calculated a beta of -5.96 (t-Value: -29.81) for sell trades and 1.93 (t-Value: 12.00) for buy trades. In other words for every one year increase in effective duration, the proceeds received by retail investors from the sale of a bond decreased by approximately 6 basis points and the price paid by retail buyers of a bond paid increased by approximately 2 basis points.

A regression of retail markup against OAS, which is a measure of the incremental return provided by a bond relative to a risk-free investment with a comparable term, produced a beta of -9.9 (t-Value -32.0) for sells and 3.6 (t-Value 13.1) for buys. This indicates that a

100 basis point change in OAS would result in a retail markup of 3.6 basis points for buys and 9.9 basis points for sales.

A regression of retail markup on total volume traded resulted in a beta of 1.03 (t-Value 10.17) for buys and -1.51 (t-Value -11.87) for sells. This indicates that retail investors pay a markup of 1 basis point for every million dollars in par value traded on the buy side and receive 1.5 basis points less in proceeds for every million dollars traded on the sell side.

A multiple regression of the absolute value of retail markup on all three variables resulted in coefficients of 7.68 (t-Value 13.58) on effective duration, 11.98 (t-Value 15.21) on OAS, and 1.15 (t-Value 6.81) on bond trading volume, with a constant of 7.53 (t-Value 2.47). While these findings suggest that the characteristics of the individual bonds influence the retail markup, the large constant term indicates that individual retail investors pay a significant markup regardless of the characteristics of the bonds bought and sold.

## **Introduction: The U.S. Bond Market and Origins of the TRACE Database**

In the United States, the bond market has historically been less transparent and more illiquid than the stock market. Unlike stocks, most bonds trade in an over-the-counter market in which buyers and sellers deal directly with one another, typically over the telephone. In contrast, the most widely held stocks generally trade on exchanges, which serve as clearinghouses for buy and sell orders and publicly disclose all securities transactions to market participants.

Traditionally, bond dealers were not required to disclose bond trades, making it difficult for retail investors to obtain information on the availability and pricing of bonds. In 2002, FINRA (then known as NASD) addressed the lack of transparency in the bond market by launching the TRACE bond transaction reporting database and issuing rules requiring bond dealers to report over-the-counter secondary market bond trades to it.

While TRACE has added much needed transparency to the bond market, the timeliness, accessibility and depth of data available on TRACE continue to lag far behind the data freely available for exchange-traded securities. Consequently, retail bond investors continue to face a market characterized by a significant level of informational asymmetry between investors and bond dealers.

## **Methodology**

To determine whether retail investors receive less favorable execution in the bond market than institutional investors, we evaluated all transactions reported to the TRACE database during 2010 for securities contained in the BulletShares USD Investment Grade Corporate Bond Indices (the “BulletShares Indices”), a family of maturity-targeted bond indices sponsored by Accretive Asset Management LLC.

The Bulletshares Indices contain approximately 1,400 of the most liquid corporate fixed income securities available to US investors. We filtered a total of 10.7 million trades and, after cross referencing the traded securities against the BulletShares indices and adjusting for outliers, created a database of 123,000 individual trades representing 1,400 securities and \$45 billion in par value of securities.

For the purposes of this study, we defined retail trades as transactions of less than \$100,000 par value and institutional trades as transactions of greater than or equal to \$100,000 par value. Market participants refer to trades of less than \$100,000 par value as “odd-lot trades.”

Our approach to segregating retail and institutional trades tracks industry practice. FINRA has reported that the \$100,000 par value cutoff is “widely used by the industry to

distinguish between retail and institutional trades.”<sup>1</sup> While not all odd-lot trades are necessarily retail trades and not all large trades are necessarily institutional trades, trade size nevertheless serves as a reasonable proxy for distinguishing between retail trades and institutional trades.

**Table 1 – Cleansed TRACE data for BulletShares Indices Constituent Securities**

**Middle 80% of Trades with Respect to Markup**

	<b>Buys</b>	<b>Sells</b>
Average Institutional Transaction (Par)	\$1,102,380	\$1,007,691
Average Retail Transaction (Par)	\$22,023	\$22,612
Average Retail Markup/Markdown (Basis Points)	37	-28
Standard Deviation of Markup (Basis Points)	34	41
Number of Data Points	10,557	9,184
Total Trades	59,734	63,134

**Table 2 – Raw TRACE data for BulletShares Indices Constituent Securities**

**Unfiltered Trades**

	<b>Buys</b>	<b>Sells</b>
Average Institutional Transaction (Par)	\$1,109,465	\$1,036,006
Average Retail Transaction (Par)	\$22,189	\$22,247
Average Retail Markup/Markdown (Basis Points)	39	-34
Standard Deviation of Markup (Basis Points)	173	81
Number of Data Points	13,198	11,481
Total Trades	73,429	85,182

<sup>1</sup> Persson, Ola Expansion of TRACE in the U.S. fixed-income OTC market

<http://www.world-exchanges.org/news-views/views/expansion-trace-us-fixed-income-otc-market#>

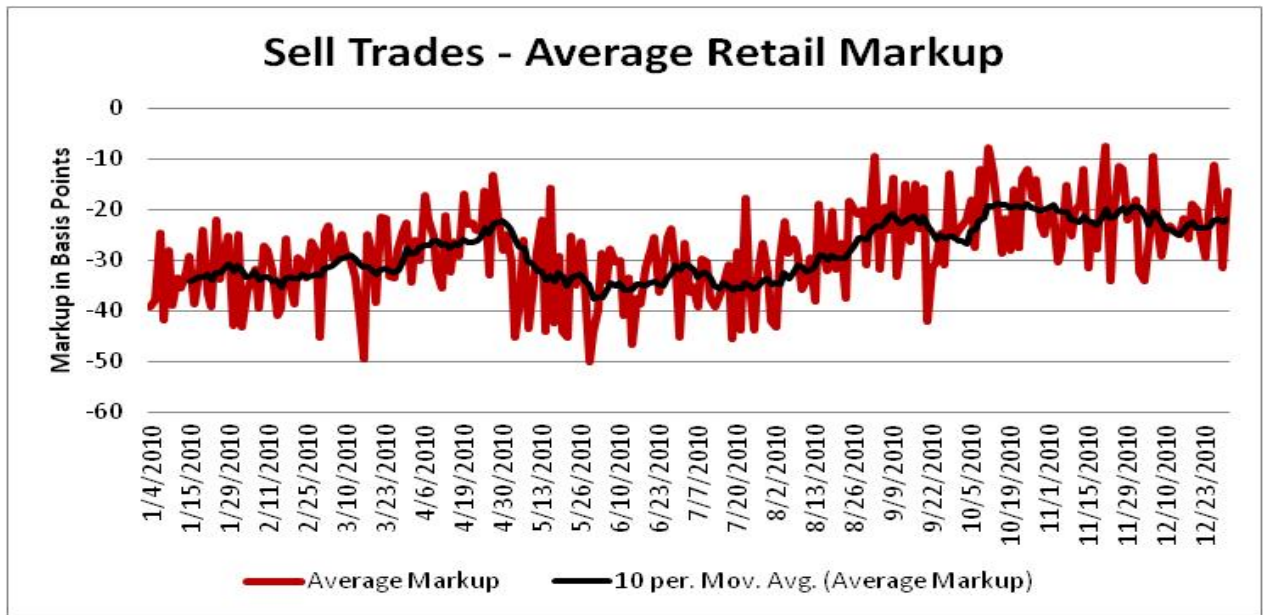
After compiling the data, we looked for matching retail and institutional trades in the same securities on the same day, meaning there was both a retail transaction and institutional transaction for a given security on either the buy or sell side. The size of the retail markup between retail and institutional for securities with matching retail and institutional trades was determined by subtracting the retail VWAP from the institutional VWAP and dividing this spread by the institutional VWAP. The resulting data set was further filtered by eliminating all trades outside of the middle 80% of the cumulative distribution of retail markups. This effectively filtered out both very high and low spreads, allowing us to reduce the impact of outliers on our findings.

We considered a range of factors that may correlate with the size of the retail markup and performed cross-sectional regression analysis of the retail markup against these variables. Factors that demonstrated a statistically significant correlation to the size of the retail markup included effective duration, OAS and total volume traded. Other factors analyzed—including credit quality, coupon rate and volatility—did not demonstrate a statistically significant correlation to the size of the retail markup. Research Findings

*The Size of the Average Daily Markup*

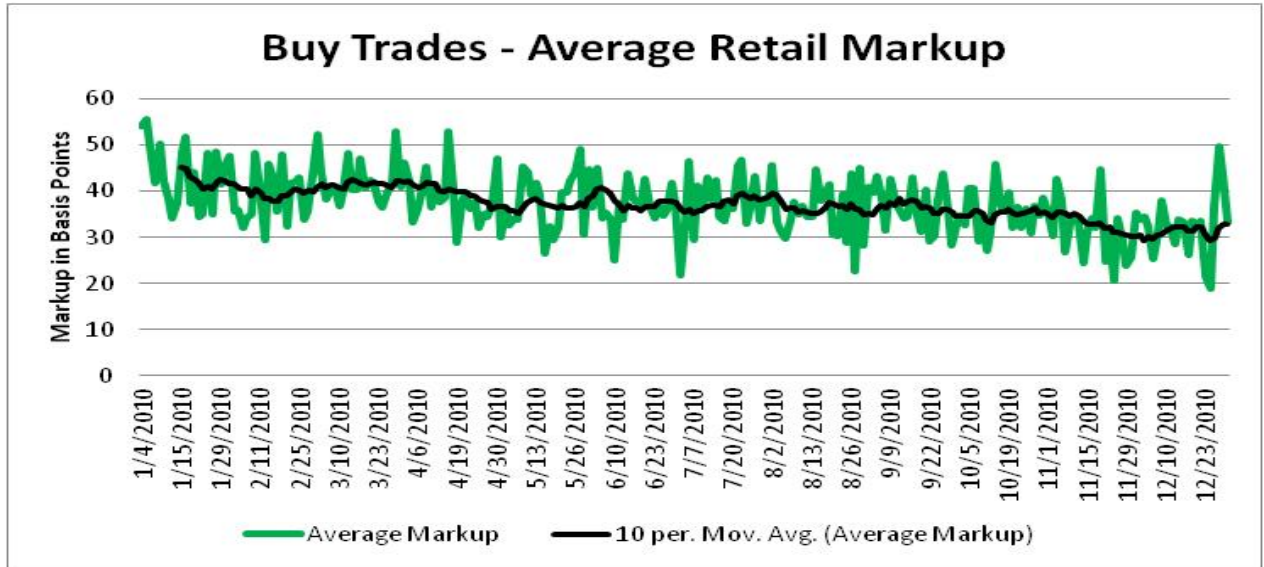
While the average daily size of the retail markup for retail investors selling bonds varied over the course of the year, it never completely diminished and, at times, exceeded 50 basis points. The table below plots the average daily markup and 10-day moving average markup on retail bond sales over the course of 2010.

**Chart 1 – TRACE Sell Trades Markup**

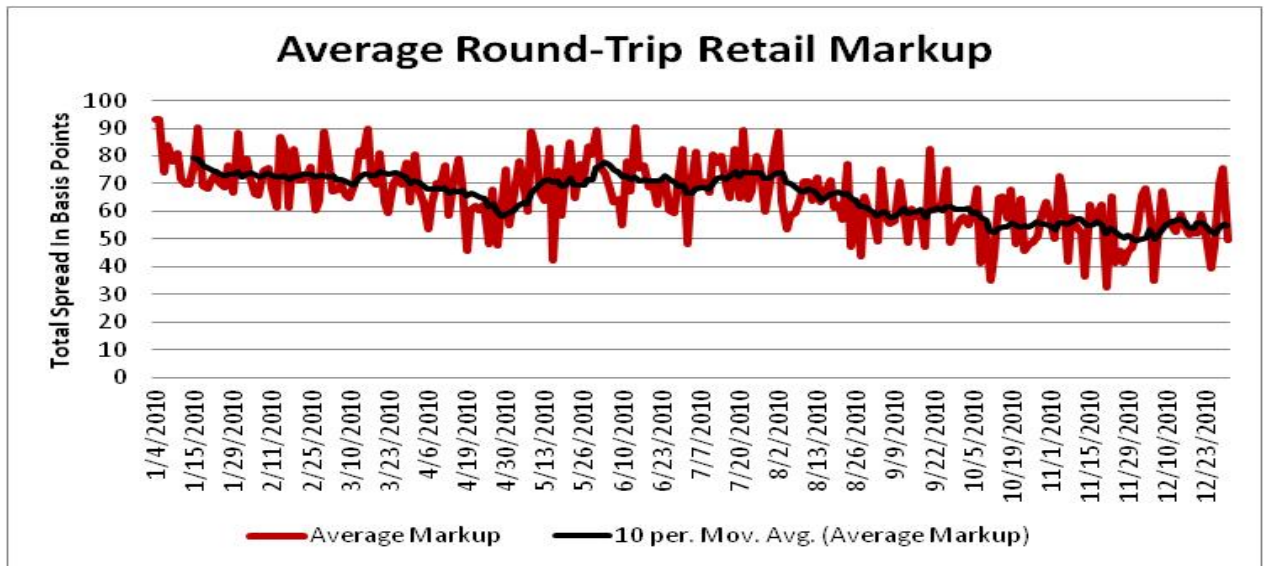


As in the case of sales by retail investors, the average daily markup for retail investors buying bonds varied over the course of the year and never diminished completely. Chart 2 below plots the average daily markup and 10-day moving average markup on retail bond purchases over the course of 2010 and Chart 3 plots the average round-trip markup faced by retail investors over the same period.

**Chart 2 - TRACE Buy Trades Markup**



**Chart 3 – Round Trip Retail Markup**



### *Retail Markups Increase with Respect to Effective Duration*

A cross sectional regression of the retail markup on effective duration suggests that retail investors selling bonds with higher durations receive significantly lower offer prices than institutional investors. The regression output below indicates that every one year increase in effective duration correlates with a retail markup of approximately of approximately 6 basis points for retail investors selling bonds.

**Table 3 – Regression of Retail Sale Markup on Effective Duration**

	Multiple R	R-Square	Adjusted R-Square	StErr of Estimate		
	0.2990	0.0894	0.0893	39.4612		
<i>Regression Table</i>	Coefficient	Standard Error	t-Value	p-Value	Confidence Interval 95%	
					Lower	Upper
Constant	-5.2923	0.8812	-6.0055	< 0.0001	-7.0198	-3.5649
Effective Duration (1yr)	-5.9603	0.1999	-29.8109	< 0.0001	-6.3523	-5.5684

Increases in effective duration are also correlated with the markup paid by retail investors in buy transactions. The regression output below suggests that every one year increase in effective duration correlates with a retail markup of approximately of approximately 2 basis points for retail investors purchasing bonds.

**Table 4 – Regression of Retail Purchase Markup on Effective Duration**

	Multiple R	R-Square	Adjusted R-Square	StErr of Estimate		
	0.1166	0.0136	0.0135	34.1432		
<i>Regression Table</i>	Coefficient	Standard Error	t-Value	p-Value	Confidence Interval 95%	
					Lower	Upper
Constant	29.8003	0.7132	41.7843	< 0.0001	28.4023	31.1983
Effective Duration (1 yr)	1.9341	0.1611	12.0031	< 0.0001	1.6182	2.2499

### Retail Markup Increases with Respect to OAS

As the OAS of bonds increases, our data suggest that retail investors pay higher prices than institutional investors for the same bonds. This finding supports the intuitive observation that bonds with higher OAS provide higher returns and therefore more opportunity for bond dealers to generate significant margins trading them. The regression output below suggests that every 100 basis point increase in OAS correlates with a retail markup of approximately 10 basis points for retail investors selling bonds.

**Table 5 – Regression of Retail Sale Markup on Option Adjusted Spread**

Multiple R	R-Square	Adjusted R-Square	StErr of Estimate			
0.3228	0.1042	0.1041	39.2364			
<i>Regression Table</i>						
	Coefficient	Standard Error	t-Value	p-Value	Confidence Interval 95%	
					Lower	Upper
Constant	-8.9762	0.7445	-12.0574	< 0.0001	-10.4355	-7.5169
Option Adjusted Spread (OAS 100 bps)	-9.93	0.31	-32.0223	< 0.0001	-10.53	-9.32

The data suggest a similar retail markup for retail investors purchasing the same bonds as their institutional counterparts. The regression output below suggests that every 100 basis point increase in OAS correlates with a retail markup of approximately of approximately 4 basis points for retail investors purchasing bonds.

**Table 6 – Regression of Retail Purchase Markup on Option Adjusted Spread**

Multiple R	R-Square	Adjusted R-Square	StErr of Estimate			
0.1290	0.0166	0.0165	34.1380			
<i>Regression Table</i>						
	Coefficient	Standard Error	t-Value	p-Value	Confidence Interval 95%	
					Lower	Upper
Constant	30.3544	0.6379	47.5875	< 0.0001	29.1040	31.6047
Option Adjusted Spread (OAS 100 bps)	3.59	0.27	13.1149	< 0.0001	3.06	4.13

### *Retail Markup Increases with Trading Volume*

While one might reasonably assume that greater daily trading volume would result in a more liquid and transparent market for any given bond, our data indicate that the retail markup faced by retail investors increases with daily trading volume for any given bond. This finding suggests that the most heavily traded bonds are also the bonds most likely to be available for retail investors to purchase (and, therefore, subsequently sell). The regression output below indicates that every 1 million dollars of par value traded for a given bond correlates with a retail markup of approximately 1.51 basis points for retail investors selling bonds.

**Table 7 – Regression of Retail Sale Markup on Trading Volume**

	Multiple R	R-Square	Adjusted R-Square	Standard Error of Estimate	Confidence Interval 95%	
<i>Regression Table</i>	Coefficient	Standard Error	t-Value	p-Value	Lower	Upper
Constant	0.1238	0.0153	0.0152	41.0348		
Total Volume (per million par value traded)	-25.1920	0.5122	-49.1883	< 0.0001	-26.1960	-24.1881
	-1.5109	.1272	-11.8732	< 0.0001	-1.7603	-1.2614

The regression output below indicates that every 1 million dollars of par value traded for a given bond correlates with a retail markup of approximately 1 basis point for retail investors purchasing bonds.

**Table 8 – Regression of Retail Purchase Markup on Trading Volume**

	Multiple R	R-Square	Adjusted R-Square	Standard Error of Estimate	Confidence Interval 95%	
<i>Regression Table</i>	Coefficient	Standard Error	t-Value	p-Value	Lower	Upper
	0.0990	0.0098	0.0097	34.2088		
Constant	35.2320	0.3948	89.2305	< 0.0001	34.4580	36.0060
Total Volume (per million par value traded)	1.0329	.1015	10.1722	< 0.0001	.8339	1.232

***Putting It All Together: The True Costs of Trading Individual Bonds***

The data indicate that on average a retail investor will pay a retail markup of approximately 65 basis points for a round-trip trade. Using our three variables, total volume, effective duration, and OAS we are able to explain approximately 23% of the variance associated with the spread that a retail investor will experience in a round trip transaction. It is our hypothesis that this markup exists because of retail investors' lack of information and limited trading venues.

**Table 9 Regression of Absolute Value of Markup on All Factors**

	Multiple R	R-Square	Adjusted R-Square	StErr of Estimate	Confidence Interval 95%	
<i>Regression Table</i>	Coefficient	Standard Error	t-Value	p-Value	Lower	Upper
	0.4786	0.2291	0.2279	51.6755		
Constant	7.5311	3.0548	2.4654	0.0138	1.5403	13.5220
Total Volume (per million par value traded)	1.1526	0.16904	6.8184	< 0.0001	.8211	1.4841
Effective Duration (1 yr)	7.6818	0.5655	13.5831	< 0.0001	6.5727	8.7909
Option Adjusted Spread (OAS 100 bps)	11.98	.0.790	15.2118	< 0.0001	10.44	13.53

## What does this all mean? The Impact of Retail Markup on Retail Investor Returns

To evaluate the impact of the retail markup on a typical investor, we constructed a hypothetical example in which a retail investor purchases a bond and holds it for 1, 3, and 5 years. For this example we will assume that the retail investor buys and sells a typical 5 year security contained within our sample set that has a coupon of 3%, a yield of 3%, and an average round trip retail markup of 65 basis points. The table below calculates the impact of the retail markup on the retail investor’s returns over each holding period.

**Table 10 – Estimated Impact of Retail Markup on Hypothetical Transaction**

Yield Table	Holding Period		
	1 Year	3 Years	To Maturity
Institutional Price Paid	\$1,000.00	\$1,000.00	\$1,000.00
Institutional Price Received	\$1,000.00	\$1,000.00	\$1,000.00
Retail Price Paid	\$1,003.25	\$1,003.25	\$1,003.25
Retail Price Received	\$996.75	\$996.75	\$1,000.00
Institutional Yield	3.00%	3.00%	3.00%
Retail Yield	2.35%	2.78%	2.93%
Reduction in Yield earned	0.65%	0.22%	0.07%
Reduction in Yield (in percent)	21.79%	7.28%	2.35%

Not surprisingly, the retail markup has the biggest impact of retail investors with a short-term investment horizon. As the holding period (and therefore total return) increases, the impact of the retail markup dissipates in percentage terms. However, even in the case of investors who hold their securities to maturity, the markup creates a significant drag on

the performance of their portfolio. Retail investors should carefully weigh the perceived benefits of purchasing individual bonds against the costs associated with the trading in such securities. It is possible that retail investors may be better served accessing the bond market through packaged products, which may benefit from institutional execution, rather than through individual bonds.