



Corporate and Municipal Bonds

by

Michael S. Piwowar, PhD¹

I. Introduction

Corporate and municipal bonds are substantially more expensive for retail investors to trade than similar-sized trades in common stocks. Trading costs including explicit commissions, mark-ups and mark-downs are significantly higher for retail-sized (small) bond trades than for institutional-sized (large) bond trades. Financial economists who study bond markets have widely attributed these two facts to the lack of reliable data on trade prices in the bond market as compared to the abundance of publicly available information on stock trades. The extent of information available on trade prices in a market is referred to as price “transparency” and bond markets have been notoriously opaque.

In this article, I will summarize key findings in the academic finance literature on bond market trading costs, including research on the effects of adding price transparency to the bond markets, and explain how bond trading costs can be hidden in realistic examples using simple numerical examples. Economic experts can help investors, and attorneys working on their behalf, uncover some of the hidden costs of trading bonds.

The lack of transparency in the bond markets has allowed market professionals - including sophisticated investors, brokers and dealers - to obtain vast sums of money from unsophisticated investors *and* taxpayers. The SEC’s global settlement of the yield-burning cases in 2000 and their more recent cease-and-desist order against the City of San Diego for committing securities fraud in the sale of its municipal bond offerings in

¹ © 2007 Securities Litigation and Consulting Group, Inc., 3998 Fair Ridge Drive, Suite 250, Fairfax, VA 22033. www.slcg.com. Dr. Piwowar is formerly of the finance faculty at Iowa State University and the Office of Economic Analysis at the U.S. Securities and Exchange Commission. He has published research on bond markets in top finance journals. Dr. Piwowar can be reached at 703-890-0742 or MichaelPiwowar@slcg.com.



2002 and 2003² are just two examples of the wide range of fraud that is possible in these opaque markets.

Recent regulatory initiatives have increased the price transparency in the secondary bond markets. Price and quantity information on the most recent bond trade is now available on a near real-time basis – for those who know where to find it. Sophisticated investors are now able to find the prices at which bonds are bought and sold, allowing them to make better decisions. Indeed, the empirical evidence suggests that *overall bond trading costs have fallen as a result of the increased price transparency*. However, while institutional investors and sophisticated investors have seen their bond trading costs fall, trading costs for retail investors remain high for one simple reason: the true costs of trading bonds are often hidden by minimal compliance with regulatory disclosure requirements or by outright fraud.

Mark-ups on principal (including riskless principal) transactions do not need to be disclosed on customer confirmations. As a result, investors may mistakenly conclude that do not incur *any* trading costs when they don't see an explicit commission, mark-up or markdown reported on the trade confirmation. In addition, high-cost bond trades may be broken up into series of several transactions that deceptively seem to involve little or no commissions or mark-ups. In fact, investors may have been unknowingly exposed to unfair prices and/or “daisy chains” that involve their broker or investment advisor favoring another customer or intermediary over them.

II. Bonds Are Expensive For Retail Investors to Trade

Empirical studies of bond markets have only recently attracted the attention of academic researchers because, until recently, in contrast to equity markets, comprehensive data on bond market transactions were almost impossible to obtain. Several recently published studies in major academic finance journals document that

² See the April 6, 2000 Press Release “SEC Settles with Ten Brokerage Firms as Part of Global Resolution of Yield Burning Claims: Total Recovery to Date Exceeds \$172 million” <http://www.sec.gov/news/press/2000-45.txt> and the November 14, 2006 Press Release “SEC Sanctions the City Of San Diego for Fraudulent Municipal Bond Offerings and Orders the City to Retain an Independent Consultant” <http://www.sec.gov/news/press/2006/2006-191.htm>.



corporate and municipal bonds are much more expensive for retail investors to trade than common stocks. This same dearth of reliable market data has allowed abusive practices to persist in the bond markets.

Regulatory initiatives now require central reporting and public dissemination of all U.S. corporate and municipal bond transactions, thereby providing market-wide, comprehensive access to data. The SEC oversees the corporate and municipal bond markets, which are also subject to oversight by the SROs (which, themselves, are subject to oversight by the SEC).

An overview of SRO regulation of the bond market looks like this:

- The NYSE is responsible for developing and enforcing rules on the small amount of corporate bond trading that occurs on its Automated Bond System.³
- NASD is responsible for operating the reporting and dissemination facility for over-the-counter (OTC) corporate bond trades, known as the Transaction Reporting and Compliance Engine (TRACE). NASD is responsible for developing and enforcing the rules for the trading that occurs on TRACE.⁴
- The MSRB is responsible for operating the reporting and dissemination facility for OTC municipal bond trades, known as the Real-Time Transaction Reporting System (RTRS). The MSRB is responsible for developing its rules, but the responsibility for enforcing its own rules is delegated to NASD.

³ The NYSE has filed a rule proposal with the SEC to replace its Automated Bond System (ABS) with a new trading technology system named “NYSE Bonds.” This article was written during the comment period for the rule proposal.

⁴ On November 28, 2006, NASD and NYSE announced plans to consolidate their member regulation operations into a new SRO. Subject to SEC approval, the new SRO is expected to begin operations in second quarter 2007.



Table 1 (at the end of this article) lists the transaction reporting facilities for the municipal and corporate bond markets and summarizes the information that is disseminated to the public.

My own research conducted while I was at the SEC⁵ was enabled by the data provided by the enhanced regulatory reporting requirements and resulted in co-authoring two articles published in the *Journal of Finance*. The first - “Secondary Trading Costs in the Municipal Bond Market” (joint with Lawrence Harris) - was published in June 2006. In our November 1999 - October 2000 sample period, we found that the average effective spread of a representative retail-sized municipal bond trade (\$20,000) was almost 2% of the price. To put this number in perspective, we pointed out that this is the equivalent of almost four months of the total annual return for a bond with a 6% yield to maturity. In comparison to a similar-sized equity trade of 500 shares of a \$40 stock (\$20,000), we stated that this would be equivalent to an effective spread of 80 cents per share.

Observed effective spreads in equity markets for retail-size trades are rarely that high, even for the most illiquid stocks. Thus, *municipal bond trades are substantially more expensive than similar-sized equity trades*.

The second study - “Corporate Bond Market Trading costs and Transparency” (joint with Amy Edwards and Lawrence Harris) - was published in the June 2007 issue. In this study, we found that the average effective spread of a representative retail-sized trade (\$20,000) in a corporate bond trade in 2003 was 1.24% of the price, making it the equivalent of over two months of the total annual return for a bond with a 6% yield to maturity. This is equivalent to almost 52 cents per share on a similar-sized equity trade of a \$40 stock.

Our corporate bond study also examined the impact of publicly disseminating information about trade prices on trading costs. Results from a multitude of tests suggested that transparency decreases customer trading costs by roughly five basis points.

⁵ I was a senior financial economist in the SEC’s Office of Economic Analysis where, among other duties, I contributed economic analysis to several SEC investigations involving alleged violations of securities laws by broker-dealers and individuals.



Our data showed that in 2003, public investors traded approximately \$2 trillion in bond issues for which prices were not published on a contemporaneously with the trades. These results suggested that investors could have saved approximately \$1 billion that year if the transaction prices of all bonds had been transparent and reported. In the corporate bond study, we carefully explained why this is a conservative (lower bound) estimate on the full cost savings of transparency. Nevertheless, the \$1 billion figure from our paper has been widely reported in the press, and has almost taken on a life of its own.⁶

Both studies developed new econometric methods to estimate average trading costs over time. We measured bond trading costs as round-trip “effective spreads,” a measure designed to capture commissions, mark-ups and markdowns. Our methods allowed us to estimate trading costs as a function of trade size. We found that average estimated trading costs decrease significantly with trade size. In other words, *retail investors generally pay substantially more to trade a bond than institutional investors.*

Our research found that trading costs increase with: (a) credit risk, (b) time since issuance and (c) time to maturity. Lower rated bonds (i.e., bonds with higher credit risk) are more expensive to trade than higher rated bonds. Throughout the life of a bond, its trading costs are lowest when it has just been issued and when it is about to mature.

Our municipal bond study also found that trading costs increase with complexity features that complicate valuation analyses for investors. The bond complexity features that we examined included: call provisions, put provisions, sinking funds, special redemption or extraordinary call provisions, nonstandard interest payment frequency or accrual basis and credit enhancements (such as bond insurance). We found that

⁶ See, for example, “Bond Traders May Save \$1 Billion If Pricing Data Improves, SEC Says,” Amy Strahan Butler, Bloomberg, 9/29/2004. Also, “Spanning the Transparency Divide FSA Points Out Differences Between European and UK Markets Amid Pressure to Make Bond Trading More Transparent,” Gillian Tett, Financial Times, 9/6/2005 begins “When the London Business School held a conference on credit markets earlier this year, Michael Piwowar, a senior official at the US Securities and Exchange Commission, produced an eye-popping statistic. After analysing recent moves that the US has taken to introduce more price transparency in corporate bond markets, Mr. Piwowar argued that US investors could save themselves \$1 billion a year in trading costs if all the prices of bond trades were displayed promptly after deals had been struck.”

municipal bond investors incur higher trading costs when trading complex bonds than when trading otherwise similar simple bonds. Not surprisingly, our evidence suggests that retail investors appear to be more adversely affected by bond complexity than institutional investors. As a result, they must rely more on their brokers to explain the product than they would for equities.

In summary, several empirical regularities are apparent from the emerging academic finance literature on bond trading costs:

- Trading costs for retail-size (small) bond trades are much higher than for institutional-size (large) bond trade and bond trading costs are substantially higher than similar-sized equity trades.
- The introduction of price transparency has benefited investors in the form of lower overall trading costs.
- However, bond trading costs for the average retail investor remain high because these costs are often still hidden from the investing public, as I will now discuss.

III. Bonds Trading Costs Are Often Hidden

By using simple numerical examples, I will now explain how bond trading costs are often hidden from the average investor. When a customer wants to trade a bond, he/she must do so through an “intermediary” - any organization (or individual representing an organization) that trades bonds with customers, or on behalf of customers.⁷ Bond intermediaries include brokers, dealers, broker-dealers, banks, buy-side institutions (e.g., mutual funds, hedge funds) and investment advisers.⁸

When an intermediary trades through its proprietary trading account, we typically say that the intermediary is acting as a “dealer.” An intermediary acting as a dealer of securities is exposed to the risk that securities held in inventory will decline in price.

⁷ The bond markets include dealers such as “brokers’ brokers” that only trade with other dealers.

⁸ There are currently no market-makers in the U.S. corporate and municipal bond markets.



Bond market regulators require that bond dealers trading through their proprietary trading accounts must report these trades as “principal” trades.

In contrast, when an intermediary simply arranges trades on behalf of customers, we typically say that the intermediary is acting as an “agent” or a “broker” and is not exposed to any price risk. Bond market regulators allow firms to choose whether they consider these economically riskless trades as “agency” trades or “riskless principal” trades in their internal accounting and reporting decisions.⁹

A round-trip “transaction chain” involves an intermediary buying a particular bond and then selling it. Counterparties in a transaction chain may include customers on both sides, or a customer on one side and an intermediary on the other. “Trading profits” are earned by an intermediary involved in a transaction chain. For example, if a dealer¹⁰ buys a bond at \$100 and then sells it at \$101, the dealer makes a trading profit of \$1 or 1%.

Trading profits earned by the dealer involved in a transaction chain are equivalent to the “trading costs” paid by the customers. In this particular example, without additional information, it is impossible to determine how the trading costs are split between the two customers. It is possible that the buyer incurred \$1 in trading costs, while the seller incurred none, or that the buyer incurred no trading costs while the seller incurred \$1. It is also possible that each customer incurred some fraction of the total trading cost. In Section II B of this article, I will show you how it’s possible that the trading costs paid by one of the customers in this transaction chain may actually exceed \$1 (with the dealer earning \$1 and the other customer essentially earning a “kickback” or rebate).

⁹ Although bond intermediaries are theoretically exposed to counterparty risk, regulatory safeguards and industry practices have virtually eliminated this risk from bond transactions.

¹⁰ To simplify the exposition, I refer to intermediaries as dealers and counterparties as customers from this point forward.

A. Excessive Commissions, Mark-ups and/or Markdowns

Until this point, I have referred to the trading costs incurred by customers without distinguishing between “commissions” and “mark-ups/markdowns.” Bond dealers are entitled to earn a commission on a trade done on an agency basis. They are entitled to earn a mark-up (when the dealer is selling) or a markdown (when the dealer is buying) on a trade done on a principal basis.

A bond dealer’s decision to report a riskless trade as an agency trade or a riskless principal trade depends on a number of factors, including: net capital rules, arrangements between clearing brokers and their correspondents and soft-dollar arrangements. Three points related to this decision are relevant to the identification and measurement of bond trading costs.

1. First, trade reporting rules don’t provide a mechanism for bond dealers to report or identify a principal transaction as a riskless principal transaction. As a result, economists (including regulatory economists) must use patterns in the data to “connect the dots” and identify transaction chains that are likely to involve riskless principal trades.
2. Second, an intermediary’s reporting decision for brokered trades affects how transparent these trading costs are to its customers. Commissions on agency transaction need to be disclosed on customer confirmations. Mark-ups (and markdowns) on principal transactions, including riskless principal transactions, do not. Customers who pay hidden mark-ups and markdowns, instead of explicitly disclosed commissions, may mistakenly conclude that they are not incurring *any* trading costs. They would be wrong.
3. Finally, firms may change how they report these trades over time. If a firm switches from an agency reporting model to a riskless principal reporting model, customers may mistakenly conclude that they are no longer incurring any costs for trading bonds because a commission no longer appears on their trade confirmations.



For example, suppose all of the transaction chains involve agency trades, so that the dealers are not exposed to any price risk and that a very liquid bond is being traded at \$100 “bid” and \$101 “ask”, establishing a “prevailing market price” of \$100-\$101. In the absence of transparent trades and/or quotes, unscrupulous dealers can pay sellers less than \$100 – say \$98 - and/or charge buyers more than \$101 – say \$103.

The total trading profits for each dealer involves some combination of a commission/markdown to the customer selling the bond and a commission/mark-up to the customer buying the bond. If the prevailing price of the bond is \$100, then \$2 in trading costs are incurred by the customer selling the bond for \$98 (\$100-\$98) and \$3 in trading costs are incurred by the customer buying the bond for \$103 (\$103-\$100). If the dealer reports these transactions on an agency basis, it would be required to disclose the commissions on each customer’s trade confirmation.

If, however, the dealer reports its transactions on a riskless principal basis, it would not be required to disclose the markdown or the mark-up to either customer. In this case, the dealer’s customers may mistakenly conclude that they are not incurring any costs for trading this bond while, in fact, they are incurring the highest trading costs in the market. The lack of transparency allows dealers to obtain a great deal of investable wealth from unsophisticated investors.

B. Unfair or Unreasonable Prices

Deceptively low trading costs can mask unfair or unreasonable prices. Assume as in our prior example, that the dealers are not exposed to any price risk - that all dealers report the trades on an agency basis - so that the commissions are fully disclosed on all customer confirmations, and that the prevailing market price is \$100-\$101.

A dealer may buy a particular bond from one customer at \$102 and sell it to another customer at \$103. Around the same time, a different dealer may pay a customer \$98 for the same bond and then sell it to a different customer at \$99.

Each dealer earns trading profits of \$1 (A: \$103-\$102, B: \$99-\$98). At first glance, these trading profits don’t appear to be excessive. However the transaction prices

of dealers are puzzling. Why did one dealer buy the bond at \$98 and another dealer sell the bond at \$103 (a difference of \$5, more than 5%) while the rest of the market is buying the bond at \$100 and selling it at \$101?

There are basically two possible answers to this question:

1. One possibility is that the dealers are just bad at pricing bonds (i.e., they don't have an accurate view of the prevailing market price of the bond). This possibility might have been plausible in the past, before last sale information became available on a real-time basis. However, now that this data is publicly disseminated, they can access the data directly themselves or use one of the many third-party pricing services to accurately determine the prevailing market price.
2. The more likely possibility is that the dealers are as good as (or better than) the other dealers at pricing bonds, but that they are favoring one customer over another.¹¹

Here's how it works in a profit-sharing arrangement: Suppose that a dealer has an unsophisticated customer who is willing to pay \$103 for the bond and the dealer knows that the prevailing market price is \$100-\$101. The dealer may have an arrangement with another customer or dealer to share in trading profits. In this case, the total trading profits are \$3. The \$3 represents the difference between the price at which the buying customer paid for the bond - \$103 - and the prevailing market price - \$100. The dealer shows a trading profit of \$1. *Who earns the other \$2?* The customer who sold the bond at \$102. The \$2 trading profit to this customer represents the difference between the price at which it was able to sell the bond - \$102 - through this particular dealer and the price it would have been able to sell the bond through one of the other dealers offering a reasonable price - \$100.

¹¹ This point is developed more fully in Craig McCann's "Detecting Personal Trading Abuses" working paper, 2003, available at www.slcg.com.

C. Daisy Chains

Daisy chains involve dealers splitting up a single transaction chain into multiple transaction changes - often involving other dealers (or customers) - for all kinds of nefarious purposes. Unscrupulous bond dealers may want to split up trading profits to avoid regulatory or legal scrutiny. They may want to hide the true trading costs paid by their customers. Some dealers may even pre-arrange daisy chains to illegally manipulate the prevailing market price of the bond. Daisy chains in the bond markets are not theory; they are reality.¹²

Figure 1 shows an example of a simple daisy chain scenario. Suppose that Dealer A has an unsophisticated customer who can be induced to sell a particular bond and another customer who can be induced to buy it. Also suppose that the bond involved in this particular example rarely trades. Without any recent last sale information, the prevailing market price of \$100-\$101 is difficult for both customers to determine. The lack of liquidity in this particular bond might justify a mark-up of up to, say 2%, so a transaction chain involving prices of \$100 and \$102 would not be considered unfair or unreasonable.

But, instead of arranging a single transaction chain between these two customers, let us suppose that Dealer A engages in a daisy chain with Dealer B. In this example, Dealer A buys the bond at \$98 from the first customer and sells it to Dealer B for \$100. Dealer B then turns around and sells it back to Dealer A for \$101. Dealer A then sells it to its second customer for \$103.

Further, suppose that Dealer A decides to report all of its transactions on an agency basis. As a result, it will have to separately disclose commissions on the customer confirmations. The first customer's confirmation would show that it sold a bond for \$100 and was charged a commission of \$2, receiving a net price of \$98. The second customer's confirmation would show that it bought the bond at \$101 and was charged a commission of \$2, paying a net price of \$103. Neither customer saw the

¹² See, for example, "Remarks Before the TBMA Legal and Compliance Conference" by SEC Commissioner Annette, New York, NY, Feb 7, 2006, <http://www.sec.gov/news/speech/spch020706aln.htm>.



other's confirmation, and if they don't take the time and effort to look at the TRACE data (or they don't even know that it exists), neither customer will have enough information to make a complaint. And they rarely do. But you could, on their behalf.

IV. Economic Analysis of Publicly Available Data Can Help Uncover Some of the Hidden Costs

These examples show how bond trading costs can still be hidden even after the introduction of price transparency. Moreover, anecdotal evidence suggests that most investors don't even know that comprehensive real-time and historical corporate and municipal bond pricing data is available. That's the bad news.

The good news is that economic experts know that the data exists, and we have developed methods to look for patterns in the data to uncover some of the hidden costs of trading bonds. Careful economic analysis can give investors valuable information about their true costs of trading bonds. Here are just a few examples.

1. Economic experts can search for transaction chains that are likely to involve economically riskless (agency or riskless principal) transactions by looking for two transactions that are reported at the same time (or very close in time) involving the same quantities of the same bond. The MSRB provides additional useful information for municipal bonds by disseminating fields indicating whether the trade was a buy or a sell and whether the transaction involved a customer or another dealer. Unfortunately, TRACE does not currently disseminate these additional data fields for corporate bonds,¹³ but the price, size and time data fields provide meaningful information nonetheless. Multiple transaction chains occurring close in time might be suggestive of daisy chains.
2. Prevailing market prices for active bonds, i.e., bonds that trade fairly regularly, can easily be determined from their transaction data. Prevailing market prices for inactive bonds can be estimated by using data on "similar" bonds. Municipal

¹³ NASD Notice to Member 06-32, June 2006, requested comment on providing these (and other) fields on a historical basis. At the time this article was written, NASD had still not formally responded to the comment request.

bonds, in general, do not trade very often. They are often issued in serial offerings which can involve 20 or more separate securities with different maturities. If a particular municipal bond does not trade very often, the pricing information of bonds in the same offering, with slight different maturities may be useful. For example, suppose an economic expert would like to know the prevailing market price of a five year municipal bond that hasn't traded in the past several weeks. The economist could look to recent prices in the four year bond and/or the six year bond (and/or other maturities) in the same offering and interpolate an estimate of the price of the five year bond. Similarly, for corporate bonds, trade prices in bonds of other issuers in the same industry with similar credit rating, similar maturity, similar features, etc. may provide useful pricing information.

Armed with accurate estimates of prevailing market prices, economists can begin to look for patterns that are suggestive of trades involving unfair or unreasonable prices. Economic experts can provide useful estimates of various dimensions of the liquidity of a particular bond, such as trading costs, trading activity, price volatility, etc.

V. Summary and Conclusions

Corporate and municipal bonds are expensive for retail investors to trade. Recent regulatory initiatives have increased price transparency in both markets, providing useful last sale information that is publicly disseminated to the market. Empirical evidence suggests that the increase price transparency has yielded lower overall bond trading costs. However, although bond prices are now transparent to all investors, the costs of trading bonds are still hidden to many of them.

Strategic behavior by bond market professionals can make it very difficult for the average investor to recognize the true costs of trading bonds. Investors may be unknowingly exposed to situations involving egregious commissions or mark-ups/markdowns, unfair or unreasonable prices, or daisy chains.



Economic experts can help investors uncover some of the hidden costs of trading bonds. Careful analysis of transaction data provided by the TRACE and MSRB (RTRS) systems can provide useful information about the true costs of trading corporate and municipal bonds for investors.

Table 1: Summary of Publicly Available Information on Bond Market Transactions

	Municipals		Corporates	
	OTC	OTC	Exchange	Exchange
Name of transaction reporting and dissemination facility/platform	MSRB (RTRS)	TRACE	ABS	NYSE Bonds
Securities included	Municipal securities	TRACE-eligible securities	ABS-Listed Bonds	Subject to SEC approval
Notable securities excluded	Municipal fund securities (529 college savings plans and local government investment pools)	Rule 144a securities ^b , sovereign debt, development bank debt, debt issued by government-sponsored entities (GSEs), mortgage-backed securities (MBSs), asset-backed securities (ABSs), collateralized mortgage obligations (CMOs), and money market instruments		
Earliest date historical data is publicly available in electronic format and easily obtained	January 24, 1995 for interdealer trades, August 25, 1998 for customer trades ^a	July 1, 2002 ^c	February 7, 2002	TBD
Types of trades reported and disseminated	Customer and Interdealer	Customer and Interdealer	Customer	Customer
Are customer/interdealer trade identifiers disseminated?	Yes	No	N/A	N/A
Are buy/sell trade identifiers disseminated?	Yes	No	N/A	N/A
Do principal trades include identifiers for “riskless principal” trades?	No	No	N/A	N/A
Do disseminated prices include mark-ups/markdowns on principal trades?	Yes	Yes	N/A	N/A
Do disseminated prices include commissions on agency trades?	Yes	Yes	No	No
Are actual trade sizes disseminated?	Capped for large sizes ^d	Capped for large sizes ^d	Yes	Yes
Are broker-dealer or customer identities disseminated?	No	No	No	No
Is descriptive data (e.g., ratings, call dates, etc.) available?	Yes	Yes	Yes	Yes

^a The MSRB historical data is not limited to “frequently traded” issues that had been disseminated on a one-day lag basis.

^b Transactions in Rule 144a securities are reported, but not disseminated.

^c Currently, the TRACE historical data product does NOT include transactions in bonds that were reported, but not disseminated before it was phased-in.

^d If the reported amount of an investment grade security is greater than \$5 million, a large volume trade dissemination cap identifier of “5MM+” is disseminated instead of the actual quantity. If the reported amount of a non-investment grade security is greater than \$1 million, a large volume trade dissemination cap identifier of “1MM+” is disseminated instead of the actual quantity.

Figure 1: Daisy Chains

