

INFORMATION TECHNOLOGY AND THE DEVELOPMENT OF THE MUNICIPAL BOND MARKET

INTRODUCTION

Like other securities markets, the municipal bond market has evolved as technology has grown over the last two decades. New technology has both speeded and simplified trade executions as well as added increased transparency to a segment of the financial markets which has heretofore been essentially overwhelmed by the sheer number of individual issues available in the marketplace. Trading in the municipal bond market continues to evolve, and as this evolution continues, it seems certain that the market itself will also continue to grow in both total size as judged by the number of outstanding issues and in terms of the number of market participants. However, in order to understand where the market is going, one must first understand where it has been and how the market itself works.

AN OVERVIEW OF THE MUNICIPAL BOND MARKET

Municipal bonds (or “munis”) are debt obligations issued by a state, city or local government to finance governmental needs or special projects. There are two general types of munis, Revenue Bonds, which are backed by the revenue of a specific project or agency receipts, and General Obligation Bonds, which are backed by the full faith and credit (i.e. the taxing authority of the issuer). From an investor’s perspective, what separates munis from other bond investments is their tax-exempt status. Although this is not true for every issue, munis are generally exempt from Federal taxes and state and local taxes when held by residents of the state in which they were issued. Munis are held by individual investors seeking the tax-exempt interest and are either held directly or indirectly through mutual funds and other co-mingled investments. Full taxpaying institutions, such as commercial banks are also investors of munis.

The size of the municipal bond market is significant. According to The Municipal Bond Association¹, there are “approximately \$1.7 trillion worth of municipal bonds currently in the hands of investors. There are more than 50,000 state and local entities

¹ The Bond Market Association, Official Website:
<http://www.investinginbonds.com/learnmore.asp?catid=8&subcatid=82>

which issue municipal securities, and 2 million separate bond issues outstanding. (It would take 90 pages in your daily newspaper to list them all.) Daily trading volume is estimated at \$11 billion.” The number of issues outstanding may be somewhat misleading as to the number of actively traded securities. Most issues are small and are thinly traded. In addition, one feature of munis is that they are typically offered with serial redemptions making each issue a separate security thus further thinning the supply. Individual investors often buy and hold their bonds until maturity. Of the total number of munis outstanding, some estimate that only about 20,000 munis actively trade.

The Handbook of Fixed Income Securities, first published in 1983, states “although municipal bonds are not listed and traded in formal institutions, there are active billion-dollar secondary markets for municipals that are supported by about a thousand municipal bond dealers across the country. In addition to brokers, daily offerings are sent out over The Bond Buyers “munifacts” teletype system, many dealers advertise their municipal bond offerings for the retail market in what is known as “the Blue List.” This is a 100+ page booklet which is published every weekday by the Standard & Poor’s Corporation.”

In describing muni trading at that time, all transactions were negotiated in OTC markets. As with other fixed income securities, institutional investors left the exchanges for the OTC market. Their experience was that they could get better executions at lower cost by negotiating directly with market makers. Although individual investors were interested in exchange listings, the volumes that they promised would have been small by comparison. In addition, as noted above, the volume of muni issues would complicate any effort to move the market to an exchange. By contrast, corporate issues are easier to commoditize and bring to an exchange because there are fewer issues and they tend to avoid serial redemptions. Bonds also don't typically trade in a centralized market like the New York Stock Exchange. They are mainly traded directly between dealers for major institutional investors.

The OTC market for muni bonds is a dealer market in which thousands of dealers participate. Until fairly recently the process for buying or selling bonds included the following steps:

- The investor calls the broker to place an order for a specific bond or type of bond;
- The broker calls a trading desk to place the appropriate order;

- The trader looks to see if the bond is wanted for the firm's inventory or is currently available from the firm's inventory;
- Depending on the results of his search, the trader has the option to send the order to an inter-dealer broker for fulfillment;
- Once the order cleared and settled, the investor was able to verify the transaction within hours

REGULATION

Following the stock market crash in 1929, Congress enacted legislation to better monitor and control the securities markets and to reign in some of the excesses that caused the stock market crash in the first place. Congress exempted municipal securities from the Depression era regulation enacted to address problems in the securities industry. Muni issuers were exempted from both the registration requirements of the 1933 Act and the periodic reporting requirements of the 1934 Act. Reasons for these exclusions included the historical relationship between different levels of government, the lack of abuses or defaults in the market at that time. In addition, because buyers of tax-exempt securities were wealthy and relatively sophisticated, the degree of protection needed was lower.

However, by the 1970's the situation had changed. As individual incomes rose, more small individual investors were participating in the market. Then, the SEC charged fraudulent muni trading practices were being practiced by a number of securities firms. The financial problems that New York City experienced leading to its brush with bankruptcy brought home the fact that there were, in fact, financial risks associated with these securities. (Likewise, the Nuclear Regulatory Commission did not require nuclear generator owners to physically segregate funds for decommissioning the power plants at the expiry of their lives until bankruptcy in that industry became a reality.) In responding to this, Congress passed the Securities Act Amendment of 1975 to broaden federal regulation of the municipal market. One outcome was the creation of the Municipal Securities Rule Making Board (MSRB). It is one of the independent, self-regulatory agencies, like the New York Stock Exchange that monitors and controls the nation's financial markets. The MSRB is without rule-making, enforcement or investigative authority. Any rules that affect the muni market must be adopted by SEC. Congress established the MSRB in 1975, "to promulgate rules designed to prevent

fraudulent and manipulative acts and practices, to promote just and equitable principles of trade, to foster cooperation and coordination with persons engaged in regulating, clearing, settling and processing information with respect to, and facilitating transactions in municipal securities, to remove impediments to and perfect the mechanism of a free and open market in municipal securities, and, in general, to protect investors and the public interest.”²

DRIVERS OF CHANGE

The growth of individual investing in general along with the growing ease of placing stock trades online have created pressure to improve bond trading systems. Although the stock and municipal bond markets have different characteristics, together they are part of a continuum of investment options. In this context, it is a competition for investment dollars between sectors and a competition for brokers to be able to capture muni investments.

A market is considered transparent when price and volume information is available in a time frame that permits acting on that information. A high degree of market transparency is an element of an efficient market because it puts both sides of the transaction on a more equal footing. Transparency has been enhanced through central collection and reporting of transaction information, but this is not yet equal to that of the stock markets.

Liquidity is the ability to trade in normal volumes without impacting the market price. Improvements in liquidity follow from enhancements in market transparency. It is suggested that this happens because the market demand for trading securities is impaired by a lack of information. Unlike the stock market, there appears to be a natural tendency to reduced transparency and liquidity because bonds are often “buy and hold” securities.

Price transparency in the muni market was enhanced beginning in 1999 when theMSRB made next-day pricing and quantity available through the Bond Market Association web site and data service.

² The Municipal Securities Rulemaking Board, Official Website:
<http://www.msrb.org/msrb1/whatsnew/default.asp>

COST

Some recent studies³, have examined the costs of trading bonds. According to the studies, the costs associated with trading corporate or munis in the OTC market appear to be competitive for institutional-sized trades. However, the cost of transacting retail-sized trades may be less competitive. In addition, unlike the stock market, the costs are not linear based on the volume of the transaction lot. Thus, the costs disproportionately affect the smaller lot size.

MSRB rules only require that prices must be fair and equitable. This allows for a great deal of discretion on the part of the market maker. In evaluating the fairness of the mark up, factors that may be considered include whether the dealer is acting as principal and thus incurring risk, the market price at the time of the trade, the expense involved in executing the transaction (including the dealers own cost structure), and the dealer's right to earn a profit on the transaction. Further confusing the information for the investor is the industry practice of including the commission in the reported transaction price. The commission is known as a "concession." In the stock market, the commission is clearly added to each Buy or Sale.

Recent reports reviewing the impact of the MSRB rules show continued high cost of transacting in the muni market for retail size trades. Although transparency may have been improved, this may reflect the physical limitations of a market resistant to commoditization and its structural bias to institutional trading. The small volumes of each issue create complex securities that require a costly trading environment.

THE EVOLUTION OF TECHNOLOGY IN THE MUNIS MARKET

Over the past two decades, the municipal bond market has undergone changes at a breathtaking pace. Like other markets, the municipal market has been influenced by the extensive and growing use of technology. The information that is now available to participants in the market allows them to manage positions, make decisions, and do their jobs better and more efficiently. Dealers, issuers, investors, and other market professionals maintain their own websites, and they are thereby capable of giving up-to-

³ Bessembinder, Hendrik, "Market Transparency and Institutional Trading Costs." <http://home.business.utah.edu/~finhb/Current%20Research/bondtransparency.pdf>. April 2005 and Securities and Exchange Commission, "The Report on Transactions in Municipal Securities." <http://www.sec.gov/news/studies/munireport2004.pdf>. July 1, 2004.

date information directly to their clients. “Historically, the municipal bonds marketplace has been slower than other financial sectors to accept technology geared toward automating transactions. In many institutions, the municipal bond function within the fixed-income securities division has been the last to be wired with computer and telecommunications capabilities. But as issuers begin to automate more of their non-debt functions (i.e., human resources and payroll), technology providers have followed with products that automate traditional debt functions”⁴. The next few pages will show a new trend in municipal bond market automation — the use of the Internet and other electronic communications networks (ECNs) in Munis trading.

A small but gradually growing number of technology vendors is widening the scope of its businesses by offering straight-through processing services to the municipal market in order to automate bond trading from execution to settlement. In using straight-through processing, industry participants reduce manual input so that the life cycle of each trade becomes much shorter through automation. This also increases efficiency. There are a number of vendors offering straight-through-processing solutions to their clients (mostly investment banks) for Munis trading. Some of these vendors provide end-to-end connectivity from pre-execution to post settlement. This allows for the possibility of dramatic changes in both customer choices and order flow in the very near future.

One large vendor constantly mentioned in the municipal bond market by participants is *Omgeo LLC* - owned in part by the Depository Trust & Clearing Corporation and Thomson Financial, a part of Thomson Corporation. Omgeo operates by offering services to clients in the fixed-income markets from the post-execution phase to the settlement phase. The firm also partners with other service providers that have complimentary services and thereby allows clients to automate the trade from the execution phase all the way through to the settlement phase. Omgeo's charges are based on value and volume, along with other minor implementation and set-up costs. Omgeo provides services that vary by client, and the firm operates on both the buy and the sell sides. The firm's service allow allocations and confirmations for a large variety of fixed-income products and electronically takes the municipal trade - once executed - straight through to settlement at DTC.⁵

⁴ Renata Morgenstern, “Electronic Bidding for Municipal Bonds: Technology Innovations for Competitive Bond Sales,” <http://www.gfoa.org/services/dfi/debt/GFR-E-bidding.pdf>.

⁵ The Bond Buyer, “Vendors Extend STP Reach, but Muni Sector Still Lags,” Thomson Media Inc, 2004: <http://www.thomsonmedia.com>, <http://www.bondbuyer.com>.

Another company offering services to institutional clients (investment banks, money managers, pension funds, mutual funds, and hedge funds) is *Bloomberg LLP*. Bloomberg operates on the front-end of a trade to provide market data on a wide variety of issues, including muni pricing, duration, and yield. The system also provides asset managers with the tools to analyze exposure to various credits and states. Bloomberg then sends market information to another vendor that facilitates trade processing. Front office work involves order management, portfolio management, allocation, sales and trading, structuring, booking and modeling out the risk of doing a deal. The middle office entails confirmation, while the back office accommodates accounting, clearing, settlement, and any post-trade event that may happen over the life of a deal.⁶

BondWave LLC is another major player in the Munis industry. BondWave is a municipal bond broker/dealer. Unlike traditional broker/dealers, BondWave does not carry an inventory of bonds. It does, however, produce software tools that support the trading process and serve as a liaison between buyers and sellers to facilitate the distribution of fixed-income securities. BondWave developed a suite of marketplace management software tools that includes dedicated client software for municipal bond buyers, such as Trust Department Traders and Separate Managed Account Buyers. In addition to demand-side tools, BondWave has developed browser-based applications for municipal bond sellers such as broker/dealers and mutual fund portfolio managers (who have bonds to sell or liquidate).⁷

Another dominant and established electronic marketplace created for the purpose of facilitating live Munis trading is *TheMuniCenter*. Its aim is to provide qualified market participants with equal access to aggregated content, liquidity, and distribution on a single easy to use site. By providing the market with a single venue for live trading, TheMuniCenter helps bring business efficiencies to the largest Wall Street dealers as well as to the smallest independent advisors. Broker-dealer clients have further increased efficiency by connecting their own trading platforms to TheMuniCenter and have thus pushed inventory to thousands of additional sales reps' desktops. TheMuniCenter's Private Label Web Service has enabled firms to create a customized and cost effective order management system for traders and brokers. Combining TheMuniCenter's liquidity with powerful software, firms can mark-up positions, add sales credits, and create client portfolio presentations with live inventory. TheMuniCenter's

⁶ The Bond Buyer, "Vendors Extend STP Reach, but Muni Sector Still Lags."

⁷ Bondwave, LLC: www.bondwave.com.

marketplace is supported by full two-way price negotiation whereby users can post bids, offers, and counters on every item listed. This functionality has given its users unprecedented access to executable markets, eliminating the need to chase down bids and offers that may or may not exist. TheMuniCenter is a ticketless trading environment, where trade information is reported in real time to clearing firms and regulatory bodies. This Straight-Through Processing allows a far greater level of efficiency than was heretofore available in this marketplace.⁸

Finally, *HTDOnline* (or *Hartfield, Titus and Donnelly, LLC*) is an online trading platform/broker geared towards Munis trading. HTD's proprietary web-enabled software *Muni Bond Basics* is designed to provide bond traders, money managers, and registered reps information about municipal bond issues underwritten in the past decade⁹. From a technological viewpoint, it is crucial to note that while all market participants buy or subscribe to at least some market monitoring technology such as news terminals and other services as offered by the above mentioned vendors, municipal market participants have had a greater tendency to build their own in-house proprietary systems than their counterparts in other fixed-income markets. This tendency arises as a consequence of the more limited number of municipal systems offered by vendors which in turn likely arises from the size and sheer complexity of the municipal bond marketplace. Traders, money managers, and other users of these technologies realize significant benefits, including cost savings and increased efficiency, and this results in an increase in their capacity to serve clients better and to thereby play a larger role in this marketplace. The result of the growth and accompanying consolidation of the municipal bond markets may one day be a municipal market bidding process that is completely automated.¹⁰

ANALYSIS

It is not at all surprising that the development of these new technological platforms has begun to radically change the municipal bond marketplace. First off, investors can now buy some municipal bonds using the Internet, and they can check out the fiscal stability of municipal issuers as well as get real-time quotes on bonds that had previously been amongst the last to move towards computerization. By providing the

⁸ The MuniCenter: www.themunicenter.com.

⁹ Hartfield, Titus, and Donnelly, LLC: <http://www.htdonline.com>.

¹⁰ Renata Morgenstern, "Electronic Bidding for Municipal Bonds: Technology Innovations for Competitive Bond Sales."

ability to conduct electronic trading and then track the results of this trading, the municipal bond marketplace has increased in price transparency and its level of transaction disclosure. Meanwhile, for issuers, e-trading has brought more individual investors to the marketplace and has consequently lowered the interest rates that municipalities must pay to borrow money. Thus, the marketplace has begun to expand, to the betterment of both bond issuers and investors.

Other changes in the marketplace are bringing down issuance costs. For example, the number of workers who are physically necessary in order to bring a municipal bond to the market has declined dramatically. One simple reason for this is that underwriting firms can now send out the myriad papers and reports that they are required to file electronically, and this saves them both printing and mailing costs as well as the labor required to put each of these heretofore significant packages together, and it makes it significantly easier for them to comply with industry regulations. Additionally, with the ways that many modern information systems are linked, bond issuers and underwriters often do not even need to re-publish information from other sources to their own clients. They can simply provide links to third party web sites in order to satisfy all of their reporting requirements. All of this may seem like a fairly simple and unsophisticated use of information technology, but the reality is that it has had a dramatic effect on municipal bond underwriting firms by lowering their overall staffing requirements and by simplifying and standardizing their reporting procedures.

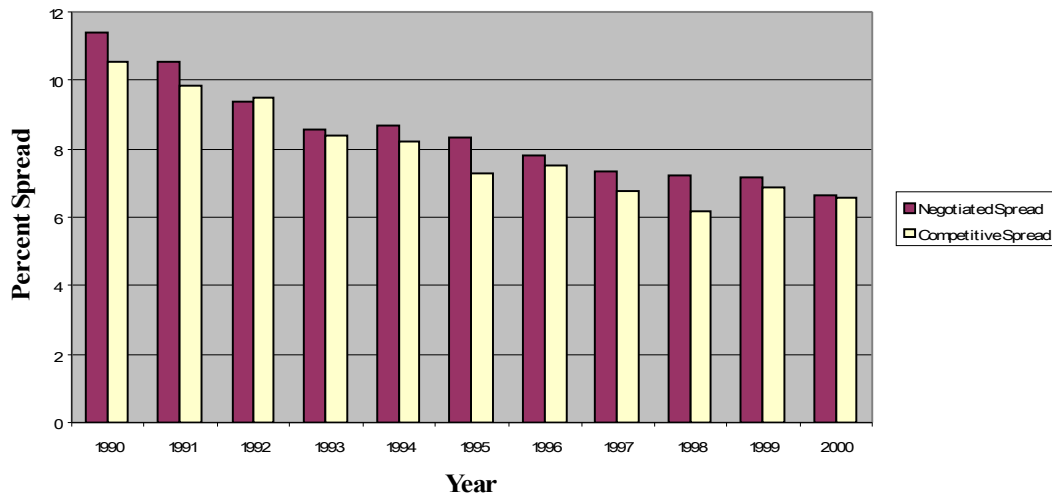
Another way in which cost have been lowered is through electronic bidding. With e-bidding, issuers are able to put bond proposals up on an electronic computer network that bond underwriters can then view remotely. Underwriters respond electronically with their bids for the business, and a process that once took days can now be completed in less than one day. Many states and municipalities prefer the e-bidding system because of its speed and overall simplicity when compared with their former way of shopping bids. For example, one of South Carolina former Treasurers, Grady Patterson said, “[E-bidding] saves a lot of money and speeds things up.”¹¹ Prior to the introduction of electronic bidding, would-be underwriters had to submit written bids, and then issuers often had to spend days sorting through the various offers to determine which underwriting firm had made the best offer. It is not surprising that this radical simplification of the system has lowered costs, but the amount that costs have dropped

¹¹ Penelope Lomov, “Muni Days Are Here Again”, *Governing Magazine*/May 2001. <http://governing.com/archive/2001/may/bonds.txt>

is surprising. According to Tim Firestine, finance director for Montgomery County, Maryland, his country's bidding costs have dropped by almost 90 compared to what they once were.¹²

But all of these savings are not without some cost. Lowered costs mean increased competition among underwriting firms, and this has resulted in dramatically reduced spreads for Wall Street firms bringing municipal bonds to market. By 2001, the average spread on a municipal bond offering was literally half of what it once was, and spreads are even lower today. This has therefore led to another major result for the industry: consolidations. Many major and minor firms have been getting out of business of underwriting municipal bonds. Thus, despite the fact that there are more than 1600 active municipal bond traders, the five largest players account for more than half of the trades in the market.¹³

Municipal Bonds and the Spread Squeeze



14

Yet even with increased ease of municipal bond trading and increased transparency in the marketplace, the municipal market remains both highly fragmented and relatively illiquid.¹⁵ With so many issuing authorities issuing so many different securities, transformation in the marketplace is not easy. Even after implementing new electronic information systems, the evidence of increased trading is comparatively slight.

¹² Penelope Lomov, "Muni Days Are Here Again."

¹³ Jason Zweig, "The Dark Side of the Muni," CNN Money (online), August 20, 2004: http://money.cnn.com/2004/08/20/funds/funds_muni_0409.

¹⁴ Thompson Financial Securities Data as quoted in *Congressional Quarterly*, Congressional Quarterly, Inc, 2001: <http://governing.com>.

¹⁵ Zweig, "The Dark Side of the Muni."

"It makes people more willing to invest in munis than they did before," said Christopher Taylor, executive director of the Municipal Securities Rulemaking Board (MSRB), the muni market's self-regulator in Washington, D.C., which launched the new reporting system. "And some dealers say they've never gotten more bids on their bonds-they're thrilled. But this market is so segmented that you might have effects in one sub-segment of the market and not in others-and there aren't enough data out there yet to draw firm conclusions."¹⁶ However, Tom Vales, chief executive of TheMuniCenter, does see increased volume is at brokerage firms that have taken his company's platform and online feed. This software system is installed on client brokers' desktop computers, and it gives these brokers a far larger inventory of municipal bonds to choose from than what would be available from just their in-house inventory. The system also provides real-time prices. According to Mr. Vales, one large retail firm has seen a six- to eight-fold increase in their municipal bond business due to his software.¹⁷ The bonds themselves have changed little beyond the lowered costs associated with issuing them, but the brokers are now able to more closely match client needs against the dizzying array of choices in the municipal bond marketplace. This has caused brokers to lead their clients towards municipal bonds where they once might have recommended other, similar securities in the past. But municipal bonds are a good investment for many clients with specific needs, and now with increased awareness of what is available in the marketplace, bond brokers can more easily find products that meet their specific clients needs.

Even so, the advent of electronic real-time price availability for municipal bonds has not led to an explosive growth of liquidity in the marketplace because, as has been noted before, the muni market has a vast number of issuing outstanding. Even with many investors working electronically, most issues still trade infrequently.¹⁸ Electronic trading works best when large trading volume is concentrated in relatively few issues and prices are easily compared, but the muni market is just not there yet, and it is hard to see how it could ever match the liquidity of many of the other financial markets. Thus, while the municipal bond market is almost as large as the \$2.7 trillion agency market, it

¹⁶ Bill Shepherd, "A Poor Relation Gets Electronic Makeover", Investment Dealers' Digest Magazine and SourceMedia, Inc., July 5, 2005: <http://www.iddmagazine.com>, <http://sourcemediacom.com>.

¹⁷ Bill Shepherd, "A Poor Relation Gets Electronic Makeover."

¹⁸ Dan diBartolomeo, "System and Technology for Municipal Bond Trading and Portfolio Management," Northfield Information Services, Inc.

is completely different in its make-up. Thus there are few, infrequent trades in an enormous array of issues.

It should be noted that even with today's modern technology, municipal bonds have not reached the level of transaction transparency that exists in the stock markets and in other bond markets. Right now there are just too many different securities, and even today's information technology cannot track all of the issues and their sparse activities. But firms are trying to meet this need, and if they have not yet completely succeeded, then they have at least made some money by making valiant efforts towards price and transaction transparency. Both TheMuniCenter and BondDesk were launched just five years ago, and both already claim to be both successful and profitable.¹⁹ Both firms are owned by groups of major broker/dealers. TheMuniCenter is owned by Morgan Stanley, Merrill Lynch, Citigroup, Lehman Brothers, Chapelaine & Co. (a large muni market maker), and Financial Security Assurance Inc. (a major bond insurer), and BondDesk is owned by Goldman Sachs, Bear Stearns, UBS, ABN Amro, Bank of America, Wachovia, and several other smaller financial firms. Clearly these firms desire to create a working national municipal bond marketplace, and as technology continues to advance and proliferate into new corners of the marketplace, one has to assume that eventually at least one of the big electronic bond exchanges is likely to develop a system that is basically equivalent to what now exists in other bond markets.

A look at where the TheMuniCenter's business model provides a glimpse at what is likely to evolve as the technology both grows more complicated and spreads throughout the market. TheMuniCenter started out concentrating in just municipal bonds, but it has slowly built a platform that many observers feel is the closest thing to a real exchange that this market currently has. It has done this by dealing with broker/dealers rather than the general public, and it is increasingly interested in working with buy-side professionals such as private-wealth managers, mutual and hedge funds, and trust departments. To avoid competing with its owners (who are using its platforms for distribution or to round up bonds for purchase), TheMuniCenter doesn't go after large institutions, and it stays out of the primary market. Thus, this more profitable segment of the market, where spreads are fatter than in secondary trading, is left to the established brokerages. TheMuniCenter also maintains anonymity of buyers and sellers by acting as counterparty in all trades, but the company itself takes no bonds into any sort of internal inventory. Rather it lists its bonds in its system and makes an effort to match

¹⁹ Thompson Financial Securities Data as quoted in [Congressional Quarterly](#).

buyers and sellers to create natural liquidity in its internal marketplace. However, even with TheMuniCenter actively listing 17,000 bonds, it is still covering only a fraction of the marketplace, and so one can see that even the large, successful platforms still have a ways to go before a national market can actually be said to exist.

SUMMARY

It is fair to wonder who has benefited from the ongoing development of the municipal bond market. Perhaps the most obvious beneficiaries of the market's changes have been the municipalities themselves. With the market growing due to the implementation of information technology, municipal governments and organizations are now able to offer their bonds to more perspective buyers, and this has brought down the costs of borrowing for them. Additionally, information technology has also reduced underwriting costs and increased the efficiency of underwriting procedures such that municipalities now receive their bids back from would-be underwriters in less than one business day, and they can evaluate these bids more effectively through the use of information technology. As was stated earlier, this reduced underwriting spreads, which is again a benefit for municipalities. Most of the large financial firms have also benefited from the use of IT in the munis market. By establishing new jointly owned entities such as BondDesk and TheMuniCenter, these firms have come close to creating a national munis market, and they have also succeeded in finding a new, more effective way to tap into the retail municipal bond market. Retail investors have also been big winners in the development of the munis market. Small time investors in the municipal bonds market have always paid the highest costs, and this is still true, but as the market itself becomes more efficient, it is at least also true that these costs are decreasing as well. In addition, through the use of IT, retail investors have far more choices about how they want to invest in municipal bonds. Similarly, institutional investors have also been aided by the growing use of IT. They too have more choices and fewer costs, and while it is true that they are also in many cases still working through the big brokerage houses for their investment needs, it is also true that their brokers can now make better recommendations and execute trades faster. The losers in this market evolution have been small time brokers and underwriting firms. Both have seen spreads and market share decline as the market has developed, and this has pushed many of them out of

the municipal bonds trade through either an inability to operate on such small margins or through consolidation.

Thus, it is difficult to predict exactly what the future of the municipal bond market will look like, but it seems very likely that the market itself will continue to grow. As technology continues to advance and, perhaps more importantly, proliferate, the development of a de facto national municipal bond marketplace seems very likely. In fact, one could argue that a national munis market already exists through TheMuniCenter, BondDesk, and other similar tech trading platforms, and indeed if one firm were to link these two largest secondary markets, that would probably be more than half the battle. It would seem a safe bet that it is only a matter of time until such a link is established. However that does not mean that this market has finished evolving. As margins and cost centers shrink, further consolidation in the industry seems a very likely possibility, and it is through this consolidation and its incumbent standardization that the national municipal bond market will likely develop in a widely accepted way. Moreover, increasing the ease with which municipal bonds are analyzed and traded is likely to add a great deal more liquidity to the marketplace. As the United States continues to grow in wealth and in average age, it is reasonable to assume that more and more individual investors will begin to look to municipal bonds as a necessary part of their portfolio strategy. From an investment standpoint, this is likely to occur because of the tax-exempt nature of municipal bonds; however, it is hard to argue that this shift would be either as feasible or as rapid as it is likely to be given the current level of technological evolution in the marketplace. The difficult thing about constructing a truly national marketplace for municipal bonds – even electronically – is tracking the very vast number of different issues in the marketplace. Even with very advanced computer systems, this has been a very tall order for a number of years. But now as revolutions of both connectivity and media storage space continue to emerge, this once impossible marketplace is approaching not only possibility but indeed reality. And as this technology continues to evolve and proliferate, it will make municipal bonds more accessible to institutional investors, professional investment managers, and even individual investors, and this, in turn, will again increase liquidity, which will again cause the market to grow. Technological changes will grow the marketplace and provide more and better investment choices as well as better terms for municipalities looking to borrow money through bonds.

BIBLIOGRAPHY

Bessembinder, Hendrik. "Market Transparency and Institutional Trading Costs."
<http://home.business.utah.edu/~finhb/Current%20Research/bondtransparency.pdf>. April
2005

Bondwave, LLC. Official Company Website: www.bondwave.com.

"Buying Bonds." CNNMoney.com: <http://money.cnn.com/pf/101/lessons/7/page6.html>. 2005.

California Debt And Investment Advisory Commission. "PRICE TRANSPARENCY
EFFORTS IN THE MUNICIPAL SECURITIES MARKET."
<http://www.treasurer.ca.gov/cdiac/debtpubs/2000/102000price.pdf>. October 2000.

diBartolomeo, Dan. "System and Technology for Municipal Bond Trading and Portfolio
Management." Northfield Information Services, Inc.

Fabozzi, Frank J. and Pollack, Irving M. The Handbook of fixed income securities.
1st Edition: 1983.

Hartfield, Titus, and Donnelly, LLC. Official Company Website: <http://www.htdonline.com>.

Lomov, Penelope. "Muni Days Are Here Again." Governing Magazine: May 2001.
<http://governing.com/archive/2001/may/bonds.txt>

Morgenstern, Renata. "Electronic Bidding for Municipal Bonds: Technology Innovations
for Competitive Bond Sales." <http://www.gfoa.org/services/dfi/debt/GFR-E-bidding.pdf>.

Securities and Exchange Commission. "The Report on Transactions in Municipal
Securities." <http://www.sec.gov/news/studies/munireport2004.pdf>. July 1, 2004.

Shepherd, Bill. "A Poor Relation Gets Electronic Makeover." Investment Dealers' Digest
Magazine and SourceMedia, Inc: July 5, 2005. <http://www.iddmagazine.com>,
<http://sourcemediacom.com>.

Technology Week. "The Electronic Investor -- Bonds, Bonds, Bonds: More advice on fixed-income securities online, a radically different duck."

http://www.bonddeskgroup.com/who/080502_barrons.shtml. August 5th, 2002.

The Municipal Securities Rulemaking Board, Official Website:

<http://www.msrb.org/msrb1/whatsnew/default.asp>.

Thompson Financial Securities Data as quoted in Congressional Quarterly:

Congressional Quarterly, Inc, 2001: <http://governing.com>.

The Bond Buyer. "Vendors Extend STP Reach, but Muni Sector Still Lags." Thomson Media Inc. <http://www.thomsonmedia.com>; <http://www.bondbuyer.com>. 2004.

The MuniCenter. Official Company Website: www.themunicenter.com.

The Bond Market Association. "About Municipal Bonds."

<http://www.investinginbonds.com/learnmore.asp?catid=8&subcatid=82>. 2005

Tinic, Seha M. and West, Richard R. Investing in Securities: An Efficient Markets Approach. 1979

Zweig, Jason. "The Dark Side of the Muni." CNNMoney:

http://money.cnn.com/2004/08/20/funds/funds_muni_0409. August 20th, 2004