
Electronic Trading Systems and Fixed Income Markets: 2001

“Do we wish the Internet never happened? Well of course we do. The old way of doing business, if inefficient at times, is a cozy world that many of us have done well in. But it happened, and we have to make sure we keep on top of it.”

—Anonymous e-commerce director at a US investment bank

Introduction

Hours after his trading staff had left for the evening, John Tormondsen (T’85), Managing Director of Fixed Income at Goldman Sachs, pondered the advent of the Internet. Its rapid adoption, and the proliferation of web-based technologies, suggested an inevitable change throughout the financial services industry – however, the ultimate impact on the fixed income markets was still unclear. Some analysts looked to the equity markets for guidance – virtual exchanges and extended-hours trading had gained a significant share of the transaction volume in stocks – but Tormondsen knew that bond trading was a decidedly different beast. Due to the numerous types of securities and their complexities, in comparison to simple common stock, bond trading would require different use of technology and business design to compete in the ever more electronic landscape.

Electronic trading systems have only recently begun to account for measurable levels of the \$88 trillion in annual trading volume in the US fixed income market. However, data discrepancies, the exaggerated claims of new entrants, and the desire of traditional financial institutions to keep trading information secret make it difficult to assess the extent to which electronic trading systems have infiltrated the market. In 2000, TowerGroup, a Massachusetts market research firm, estimates that currently 10% of all transactions in the fixed income market are executed electronically, compared to approximately 25% in the

This case was prepared by Jonathan Joys (T’02) of the Tuck School of Business at Dartmouth under the supervision of Professor Richard A. D’Aveni. The assistance of John Tormondsen (T’85) and Tanuj Kana at Goldman Sachs is gratefully acknowledged. It was written as a basis for class discussion and not to illustrate effective or ineffective strategic management. The authors gratefully acknowledge the support of the Glassmeyer/McNamee Center for Digital Strategies, which funded the development of this case. CDS Case #01006. Version: April, 2001.

© 2001 Trustees of Dartmouth College. All rights reserved. For permission to reprint, contact the Center for Digital Strategies at 603-646-0899.

equity market. TowerGroup also estimates that the proportion of fixed income securities traded electronically will rise to almost 60% by 2004.

The stakes were high. With the decline of the equity and high-yield bond markets during economic slow down starting the last quarter of 2000 and continuing through early 2001, investment grade fixed income securities are poised to outperform stocks for the first time since 1990, barring any dramatic rebound in the equity market. John knew that a rapid, widespread adoption of electronic trading systems would have broad implications for the bond markets. With technology expenditures rising and margins falling, managers up and down Wall Street were faced with determining which of the electronic systems had the greatest chance for success and what overarching strategy would best enable them to maintain their lucrative position as a traditional intermediary in this sector of the capital market.

Bond Market Basics

Overview of the Market Structure

Fixed income securities are issued in the primary market and subsequently traded in the secondary markets. The primary market is typically conducted in various auction formats. In contrast, the secondary markets have historically been organized as “over-the-counter” markets in which dealers (investment banks and interdealer brokers) rely on telephone-based communications – and some use of private electronic networks – to search for buyers and sellers of a certain security. Large investment banks organize trading “desks” to handle different fixed income securities in the secondary market. These desks are typically segmented by product-type – such as government bonds, corporate bonds, asset-backed securities, municipal bonds, etc.

Intermediaries in the fixed-income markets perform a variety of functions for a fee. They assist issuers in the marketing, pricing, and distribution of the security. They also make a secondary market in securities by identifying and matching buyers and sellers. In addition, they make the secondary market by purchasing and then reselling securities with the firm’s own capital, with the aim of either taking an advantageous position in a security, or in anticipation of eventually matching an order of a client. This provides both the “liquidity” for the bonds in the secondary market, and constitutes proprietary trading activities, from which investment banks hope to earn profits from customer orders or price movements that could benefit their proprietary positions. Typically, the major intermediaries do not earn commissions as stockbrokers do.

Proprietary positions may include outright purchase and immediate resale of the security. They may also include taking a “short” or “long” position. In these cases the intermediary takes the risk of market movements in bond pricing due to interest rate shifts because they have made commitments to sell a security without already owning it (selling short), or to buy the security to hold in inventory without any specific investor identified for resale of the security (going long).

Other players provide issuers, intermediaries and investors with: (1) credit information about the issuers, (2) credit enhancement on bond issues (by guaranteeing repayment), or (3) legal, financial, accounting or SEC reporting services. These services further promote efficiency and liquidity in the debt markets by making information readily available, by eliminating legal and financial risks, or by facilitating trading activities.

Types of Securities

Bonds are issued by a variety of entities, including the U.S. government, state and local municipalities, domestic corporations and federal agencies (such as the TVA, Fannie Mae, Freddie Mac), among others. Unlike the equity markets, which are essentially a singular type of security, the fixed income markets are made up of a multitude of unique products that have different characteristics in the eyes of investors.

Fixed income securities vary in their characteristics. Differences include: legal complexity, collateralization, duration, and covenants (that restrict dividend payouts, working capital requirements, future debt issuances, refinancing alternatives, and corporate governance). Other differences include subordination (of claims upon bankruptcy) and other credit risks, payment terms, and customization for a particular issuer's needs, as well as interest rates and price. Securities with more complex or unusual attributes require more extensive marketing and explanation to investors.

Fixed income securities also have different degrees of liquidity associated with them. The various credit profiles of issuers represent varying degrees of default risk to investors, often eliminating risk-averse investors as potential buyers of some securities. The amount of debt outstanding of a particular type of fixed income security (supply) and the number of buyers (demand) and sellers (supply) participating in that particular market differ by type of security, and affect the degree of liquidity for that security. With more liquidity in a market for a particular security, the spread (the difference between the buyer's quoted bid and the seller's ask price) will be narrower. Consequently, the bond price will be closer to the "fair market value" of the security.

U.S. Treasuries are the most liquid of all of the fixed income securities because the bond characteristics are relatively standardized and the issuer is well known and risk-free. They make up close to 60% of the average daily trading volume because of the total outstanding U.S. Treasury debt available for secondary market trading and because of the vast number of investors who want them to satisfy their asset allocation objectives. But Treasuries yield the lowest margins due to the efficiency of the Treasuries market.

At the other end of the extreme, fixed income derivatives (futures, forwards and swaps, among others) are based on complex combinations of underlying assets, which can include bonds, stocks, commodities, or various exchange rates and interest rates. Derivatives are designed by investment and commercial banks on a customized basis for their corporate and governmental clients as a hedge against the risk of price fluctuation due to changing market conditions. Investors in derivative securities often require the advise of market professionals to evaluate these instruments' sensitivity to price fluctuations in the underlying assets. These

positions must be continually monitored to prevent substantial losses that are possible due to adverse market movement. Therefore, derivatives have a more complex credit and interest rate risk profile. As a result, derivative products appeal to a limited investor group and require a greater degree of explanation for investors to engage in trading.

Between these two extremes are a vast number of different issuers and security types. In approximate order of complexity and diversity of characteristics (from least to most), long-term fixed income securities include: municipal bonds, agency bonds, corporate bonds, asset- and mortgage-backed securities. Shorter-term fixed income securities include: commercial paper (short term corporate loans for up to 270 days) and repurchase agreements (repos). Repos are loans to dealers that are collateralized by a government security and coupled with an agreement to repurchase the note within several weeks and sometimes even overnight.

Municipal and federal agency bonds have greater credit risk than Treasuries, and corporate securities have even greater credit risk. Consequently, different segments of investors are interested in these securities. Plus, municipals and some federal agency bonds offer tax-benefits to investors, attracting a bigger retail interest than other fixed income securities do. Thus, intermediaries must target different investors, using different marketing strategies.

Size of the Fixed-Income Markets

By the end of 2000, there was approximately \$15.8 trillion in outstanding debt on the books of public and private U.S. entities, of which U.S. corporate debt and treasury debt made up \$3.4 trillion and \$3 trillion, respectively. Growth rates by type of debt and percentages of total debt have shifted significantly over time. (See table 1)

Table 1: Outstanding U.S. Public & Private Debt (\$Bn):

	Municipal	Treasury (1)	Agency Mortgage- Backed (2)	U.S. Corporate	Fed Agency	Money Market (3)	Asset- Backed (4)	Total
1985	859.5	1,437.7	372.1	776.5	293.9	847.0	2.4	4,589.1
1990	1,184.4	2,195.8	1,024.4	1,350.4	434.7	1,156.8	87.0	7,433.5
1995	1,293.5	3,307.2	1,570.4	1,937.5	844.6	1,177.3	291.6	10,422.1
2000	1,555.3	2,966.9	2,490.6	3,372.0	1,906.6	2,655.8	854.0	15,801.2

Sources: US Department of Treasury and Federal Reserve System

1. Interest bearing marketable public debt.
2. Includes only GNMA, FNMA and FHLMC mortgage-backed securities.
3. Includes short-term debt instruments, such as commercial paper, bankers' acceptances and large time deposits.
4. Bond Market Association estimates.

In 2000, the new issuances in primary markets totaled \$2.1 trillion, of which corporate debt made up \$507 billion. Mortgage-backed securities totaled \$483 billion, while federal agencies totaled \$408 billion and treasuries totaled \$282 billion. Asset-backed securities and municipals totaled \$230 billion and \$200 billion, respectively. Considering the U.S. government's current and projected budget surpluses, new issuances of Treasuries may decline unless the economy slows more than anticipated or Congress passes a very large tax cut during 2001.

In 2000, daily trading volume in secondary markets averaged \$368 billion, of which approximately \$207 billion was executed in the treasury markets. Federal agencies and mortgage-backed securities were each \$73 billion and \$70 billion daily, respectively. Secondary market volume in municipal and corporate securities in 2000 was approximately \$10 billion each. (See figure 1, 2 & 3)

Figure 1: Outstanding US Public & Private Debt (\$15.8 Trillion)

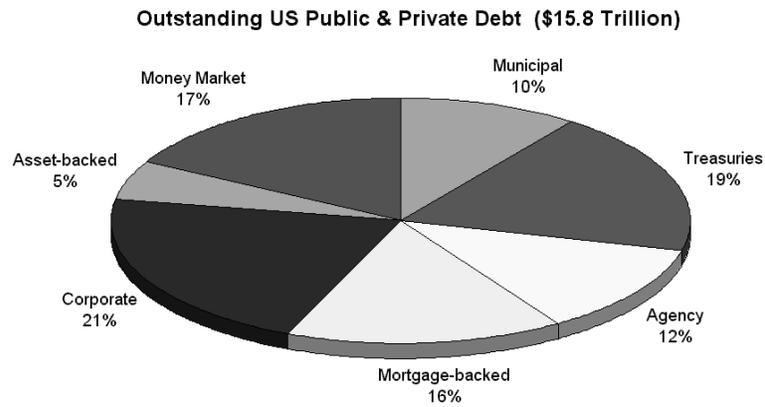


Figure 2: New Issue Market (\$2.1 Trillion Annually)

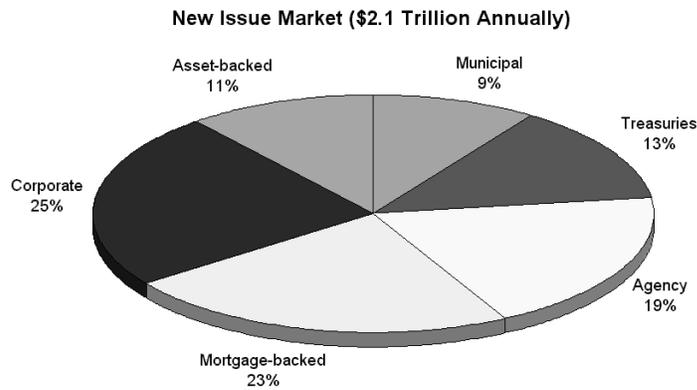
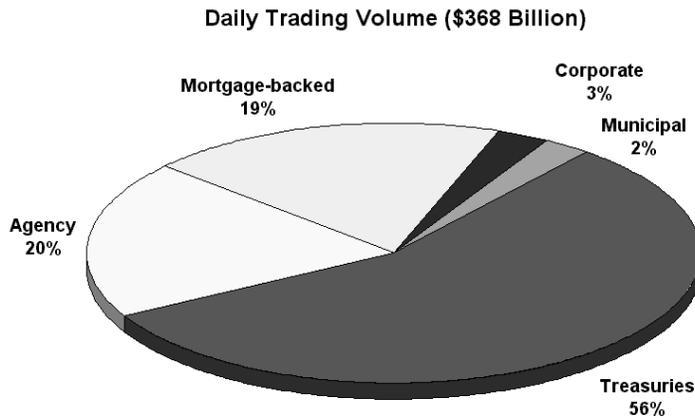


Figure 3: Daily Trading Volume (\$368 Billion)



Sources: US Department of Treasury and Federal Reserve System

Objectives of the Key Market Participants

The principal market players and their objectives are outlined in the following simplified table:

Table 2: Objectives of the Key Market Participants

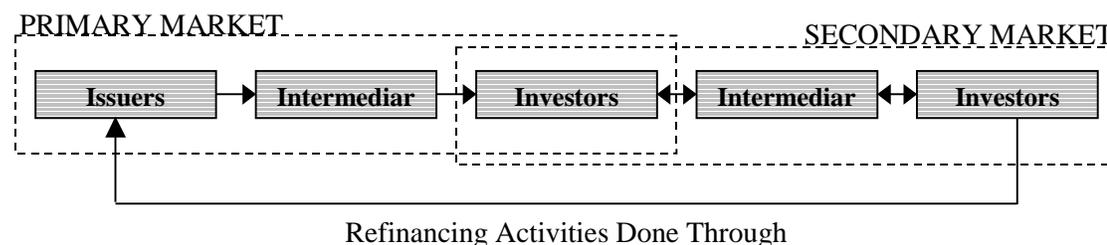
Issuer of Debt Securities	Financial Intermediaries	Institutional and Retail Investors
Issuers: 1. Governments, municipalities and their agencies (e.g., Fannie Mae, Freddie Mac) 2. Corporations 3. Commercial banks 4. Foreign institutions	Intermediaries: 1. Investment banks 2. Commercial banks 3. Foreign banks 4. Interdealer brokers	Investors: 1. Governments 2. Pension funds 3. Insurance companies 4. Mutual funds 5. Commercial banks 6. Foreign institutions 7. Large corporations 8. Individuals (high-net wealth and retail investors)

Table 2: Objectives of the Key Market Participants (continued)

<p>Objectives:</p> <ol style="list-style-type: none"> 1. To get a fair price for their securities with minimal transaction costs. 2. To be able to refinance outstanding debt by repurchasing securities, at minimal transaction cost. 3. To access an orderly and liquid secondary market, allowing them to price future issues without sacrificing value to the intermediaries or investors. 4. To get information and expertise necessary to design and distribute securities best suited for their needs and current market conditions. 	<p>Objectives:</p> <ol style="list-style-type: none"> 1. To generate revenues for underwriting and distributing securities in the primary market. 2. To generate profits from inventory turnover (bonds purchased and resold) without excessive credit or interest rate risk. 3. To maintain liquidity in the secondary markets in order to maintain a low-transaction cost way to sell their inventory in various securities. 4. To maintain anonymity in order to avoid “spooking” the market by signaling intention or information advantage. 5. To gather information regarding the market value of securities to benefit trades, for their own position or those of their clients. 6. To generate fees from advising clients in managing risk and investment portfolios. 	<p>Objectives:</p> <ol style="list-style-type: none"> 1. To buy securities of different risk-return profiles at a fair price. 2. To obtain diversification at a low transaction cost. 3. To reverse previous decisions at a low cost and risk. 4. To have access to risk management services such as derivatives (complex debt products which act similar to futures and options). 5. To get information on security details and issuers’ credit profiles at a low cost. 6. To get accurate advice from experts on bonds and market conditions easily and quickly, at the lowest possible cost.
---	---	---

Simplified Activity Chain in Fixed-Income Markets

Figure 2: Activity Chain



Dealers

Dealers perform several value added activities, including offering advice, expertise and judgment. Dealers are also an aggregator and disseminator of market information and

proprietary research. Involving a dealer with years of experience and contact with buyers gives assurance to the investor or issuer, protecting them against counter-party risks, such as reneging buyers or sellers. The value provided by dealers is illustrated below in table 3.

Table 3: Value Provided by Dealers

Aggregate and disseminate information to issuers	Create new debt instruments	Aggregate and disseminate information to investors	Market making
--	-----------------------------	--	---------------



Market Making				
Maintain Buyer/Seller Liquidity	Buy/Sell to Match Trading Orders	Commit Capital to Facilitate Trades	Actively locate investors for new issue bonds or trades for their own accounts	Execute and process the transaction

The largest dealers combine to control the vast majority of transaction volume in the secondary markets for fixed income securities. These firms typically focus on the largest 200-300 investor accounts, though the most significant proportion of the trading volume comes from the top 50. Smaller or regional dealers focus on the remaining investors, who require a level of attention that the large dealers won't provide to smaller investors.

Interdealer Brokers

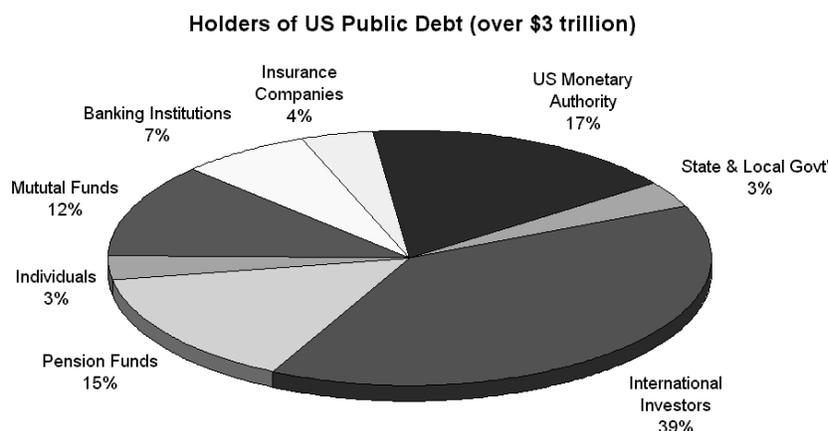
Interdealers act on behalf of dealers wishing to trade with other dealers. Using these interdealer brokers, dealers can anonymously execute proprietary trades (often with several simultaneously). This is important when a dealer or investor wants to trade without signaling its intention or identity, which could influence the security's price or availability. Interdealer brokers are paid volume commissions for aggregating and disseminating orders (by way of private electronic networks). They collect bids and offers from multiple, often competing dealers anonymously. They exist because the large dealers do not want to give up any advantage they have from information asymmetries generated by their research analysts or sales force. Examples of interdealer brokers are Cantor Fitzgerald and Garban Ltd.

Institutional and Retail Investors

The top ten money managers currently control approximately \$5 trillion in fixed income assets. They value both anonymity (so that large transactions do not effect the market price) and transparency—knowledge of all available quotes and the identity of who made them—to

ensure the best available pricing. They also value speed of execution and low search and other transaction costs.

Institutional money managers run a variety of funds. The trading strategies of these managers range from aggressive to conservative risk taking, and vary with from active to passive readjustment of their portfolios. Typically, treasuries and investment-grade corporate debt are purchased by all the investors segments, except retail and high-net worth customers. High-yield corporate debt (junk bonds) may be avoided by conservative funds, but many include a small portion to enhance their fund's upside potential. Tax-exempt municipals are attractive to retail customers, commercial banks and property-casualty insurance funds, which tend to be in high tax brackets. These three groups hold the vast majority of outstanding municipal debt. Pension funds tend to avoid municipals because they are already tax-deferred investment vehicles. Large foreign commercial and central banks hold a significant portion of outstanding U.S. treasuries. (See figure 3)

Figure 3: Holders of US Public Debt (over \$3 trillion)

Sources: US Department of Treasury and Federal Reserve System

The Traditional Fixed-Income Dealers

All of the major traditional investment banks tout their “full-service” capabilities in marketing themselves to potential clients. However, certain firm characteristics explain varying performance in specific product sectors. Merrill Lynch, UBS PaineWebber, Morgan Stanley (Dean Witter), and Salomon Smith Barney have the largest retail distribution capabilities. Goldman Sachs and Bear, Stearns are known for creating and marketing innovative security products. For example, Goldman Sachs was ranked number one by portfolio managers (from the 300 largest asset management firms) during year 2000 in fixed income swaps, a type of derivative. Foreign-based commercial and investment banks typically lead in trading foreign fixed income securities. For example, the same portfolio managers ranked UBS PaineWebber number one during year 2000 in foreign sovereign debt (the foreign equivalent of US treasuries) and in Yankee bonds (US dollar denominated foreign bonds). Size also matters. The largest investment banks dominate the transaction volume because of their global trading presence and the amount of capital committed to proprietary trading and to creating liquidity.

Portfolio managers from the 300 largest asset management firms also ranked fixed income trading firms as follows in table 4.

Table 4: Overall Rankings

1999 Rank	2000 Rank	Firm
1	1	Salomon Smith Barney
2	2	Merrill Lynch
3	3	Goldman Sachs
4	4	Lehman Brothers
5	5	Morgan Stanley (Dean Witter)
6	6	Bear, Stearns
7	7	CS First Boston**
8	8	PaineWebber*
9	9	JP Morgan
12	10	UBS Warburg*
14	11	Deutsche Bank Securities
10	12	Prudential Securities
13	13	Chase Securities
11	14	Donaldson, Lufkin & Jenrette**
15	15	Bank of America Securities

Source: *Institutional Investor*, November 2000, p. 107

* Merged subsequent to survey

** Merged subsequent to survey

These results suggest that the top ten are fairly stable, but Deutsche Bank is rising in the eyes of their customers, while DLJ fell in the rankings. Goldman is a strong player with select strengths as illustrated below:

Rankings by Type of Security

Table 5: Markets where Goldman Sachs is the leader:

Treasuries

2000 Rank	Firm
1	Goldman Sachs
2	Merrill Lynch
3	Salomon Smith Barney
4	Lehman Brothers
5	Morgan Stanley (Dean Witter)

Table 5: Markets where Goldman Sachs is the leader: (continued)

Commercial Paper

2000 Rank	Firm
1	Goldman Sachs
2	Merrill Lynch
3	Lehman Brothers
4	CS First Boston

Corporate Bonds (High-Yield)

2000 Rank	Firm
1	Goldman Sachs
2	Salomon Smith Barney
3	Donaldson, Lufkin & Jenrette
4	Merrill Lynch
5	Bear, Stearns

Source: *Institutional Investor*, November 2000, p. 108

Table 6: Markets where Goldman Sachs is in a strong to moderate position:

Agency Bonds

2000 Rank	Firm
1	Merrill Lynch
2	Goldman Sachs
3	Salomon Smith Barney
4	JP Morgan
5	Morgan Stanley (Dean Witter)

Corporate Bonds (Investment Grade)

2000 Rank	Firm
1	Salomon Smith Barney
2	Merrill Lynch
3	Goldman Sachs
4	Morgan Stanley (Dean Witter)
5	Lehman Brothers

**Table 6: Markets where Goldman Sachs is in a strong to moderate position:
(continued)**

Repurchase Agreements

2000 Rank	Firm
1	Lehman Brothers
2	Salomon Smith Barney
3	Goldman Sachs
4	Morgan Stanley (Dean Witter)

Municipal Bonds

2000 Rank	Firm
1	Salomon Smith Barney
2	Merrill Lynch
3	Lehman Brothers
4	PaineWebber
5	Goldman Sachs

Source: *Institutional Investor*, November 2000, p. 108

Table 7: Markets where Goldman Sachs is outside of the top five:

Asset-Backed

2000 Rank	Firm
1	Lehman Brothers
2	CS First Boston
3	Salomon Smith Barney
4	Morgan Stanley (Dean Witter)
5	Bear, Stearns

Collateralized Mortgage Obligations

2000 Rank	Firm
1	Salomon Smith Barney
2	Bear, Stearns
3	PaineWebber
4	Lehman Brothers
5	CS First Boston

Source: *Institutional Investor*, November 2000, p. 108

Enter the Internet

No different than any other industry, the fixed income markets' adoption of the Internet represents a significant shift in power. The principal advantages that the internet brings to the bond markets are: (1) greater availability and speed of information, (2) the possibility of direct trading between investors, (3) reduced cost and errors in processing transactions, and (4) increased speed of execution. It also improves liquidity by providing the smaller investors (below the top 200) access to markets and transactions from which they were previously locked out.

Proliferation of Electronic Trading Systems

Year 2000 was widely considered the year of the press release for online fixed-income markets. By the end of the first quarter of 2001, there were 89 fixed-income electronic trading systems – up from 40, 27 and 11 in 1999, 1998 and 1997, respectively. Despite some having been around over three years, electronic trading has yet to gain the widespread market acceptance predicted by some proponents. But even though the electronic systems have established little more than a foothold in fixed income trading, market players have invested significant resources in the development of alternative trading systems – some experts have estimated the cost of developing, staffing, marketing and launching an electronic trading platform at \$50-\$100 million.

Five Basic Types of Electronic Trading Systems

A variety of structures for the ownership of the trading system, the source(s) of securities supplied to the system, and clearing mechanisms have been established. These are:

- **Single-Dealer Systems** are owned and managed by a single major dealer/investment bank, which provides the supply of bonds and acts as the principal dealer in all transactions. These platforms are essentially a digital listing service, enabling customers (investors or interdealers) to search among that dealer's inventory of bonds in the primary or secondary markets. Some dealers have long since established private electronic networks to handle this service, but accessing these listings has shifted almost entirely to the Internet, making them open to a larger group of investors.
- **Multi-Dealer Systems** are owned by a consortium of dealers that provides the system with its inventory of securities. The consortium members participate in the governance of the system's trading rules and membership. The system electronically displays the best bid or offer price for the customer's security. The parties then decide to agree, withdraw their bid or offer, or change their bid or offer. The consortium members may or may not be required to supply a fixed amount or percentage of the system's liquidity. They are typically involved in committing capital to facilitate execution of trades. In many cases several types of securities are sold through the same system. A system's

rules can require that buyers and sellers remain anonymous, but many disclose the identity of the parties. A system can change its rules if its owners agree.

- Cross-Matching Systems bring dealers and investors together, providing periodic sessions where customers submit anonymous buy and sell orders. The system displays these orders and electronically executes them if a counterparty has entered a matching order at the same price while the bid or offer is still open. Banks, money managers, venture capitalists, and Internet startups often own these systems.
- Interdealer Systems place the private electronic networks of traditional interdealers on the Internet, enabling a wider group of dealer-to-dealer anonymous trades.
- Auction Systems allow participants to conduct electronic auctions much like eBay does for goods and services. They are typically focused on either the primary or secondary market, but rarely on both. Issuers or sellers typically post the key details of the security being offered and the auction rules (i.e., anonymity or not, payment terms, bid timing and duration, rights to refuse all bids, bidder disclosure requirements, minimum bids, and other procedures that will be used during the auction). Some of the auction systems are owned by Internet startups and financial institutions such as American Express Credit Corp and Ford Motor Credit Corp, and financial information providers like Bloomberg.

The revenue models employed by these electronic trading systems are largely kept secret from the public. Each type of trading system could feasibly support a variety of revenue models. However, it is unclear whether any of the electronic platforms can operate as a for-profit entity. Many analysts believe that these electronic trading systems are merely a “utility” for communication among their owners and/or clients.

The Bond Market Association’s 2000 [Review of Electronic Transaction Systems](#) presents a thorough overview of the types of systems and the established electronic players.

Goldman Sachs’ Initiatives

The major investment banks have taken multiple strategies regarding their own approach to electronic trading because of the uncertainties over optimal system design, viable revenue models, and the speed of their ultimate adoption by traders. Some have gone forward in developing an electronic platform as an extension to their traditional trading channels. Others have remained on the sidelines, opting not to join consortiums or commit the resources to developing a platform of their own because of the cost and risks.

In contrast, Goldman Sachs has chosen to invest in multiple platforms and consortiums in order to diversify their electronic system strategy. Goldman has:

- Developed a single-dealer trading site, Web.ET, to execute transactions directly with its customers.

-
- Partnered with eleven other major dealers in launching BrokerTec, an anonymous interdealer site.
 - Joined a consortium with six other major dealers in supplying liquidity to TradeWeb, a multi-dealer site where customers select five dealers from whom they solicit bid or ask quotes. The customer receives quotes only from the selected list.
 - Allied with four other major dealers in developing BondBook, which is a multi-dealer, anonymous electronic exchange that lists live bid and offer prices, against which any participant can execute trades in real-time.

Goldman is involved in several multi-dealer systems presumably due to their appeal to investors who want to encourage more competition among the top dealers. However, multi-dealer systems are difficult to manage as a result of the incompatibility, or mutual suspicion, of their founding members. Governance nightmares often result from conflicts over which banks should be members, which should be excluded, and who should sit on the board. Disagreements are common over what type of oversight committee should be established, who can interact with clients, what the rules of the system should be, and how strategy should be determined.

Goldman Sachs has also invested heavily in electronic “pricing engines.” These have allowed Goldman to respond to bids and ask quotes from any one of the electronic systems they’re involved in, almost instantaneously. These engines provided considerable advantage for Goldman’s proprietary trading activities, winning a lot of business because of their response time. However, as others dealers have developed or purchased their own pricing engines, this advantage began to erode.

Early Trends and Emerging Winners

Trends

Growth in the number of electronic trading systems is displayed in table 8 and 9 below.

Table 8: Total Number of Trading Platforms at Year-end by Type of System

System Type	1997	1998	1999	2000
Auction	1	3	10	14
Cross-matching	2	6	8	22
Interdealer	1	0	5	11
Multi-dealer	0	4	3	8
Single-dealer	7	12	13	18
Other	0	2	1	0
Total	11	27	40	73

Source: Bond Market Association’s *2000 Review of Electronic Transaction Systems*

Table 9: Total Number of Trading Platforms at Year-end by Type of Security

Market Sector	1997	1998	1999	2000
Agency	5	8	17	31
Asset-backed	0	1	2	6
Corporate	2	9	14	29
European	N/A	N/A	N/A	16
Mortgage-backed	2	3	5	14
Money Market	3	5	13	13
Municipal	3	10	18	31
Repurchase	4	4	4	4
Government/Treasuries	9	20	27	35
Other	0	0	0	11

Source: Bond Market Association's *2000 Review of Electronic Transaction Systems* (Totals may exceed total number of systems since some systems cross multiple product lines).

The most explosive growth of late has taken place in cross-matching systems, where year 2000 saw their numbers nearly triple. The tidal wave of new trading platforms has fragmented trading activities and made it difficult to generate sufficient liquidity and revenue. Thus, a shakeout and/or consolidation wave may be imminent.

Growth has slowed in certain sectors as a result of saturation, especially in the most liquid and standardized product markets, such as Treasuries. Knowledgeable industry sources estimated that approximately 20-22% of the daily trading volume of some major dealers of U.S. treasuries is executed through electronic systems. Recent growth has been strongest in the mortgage-backed, agency and municipal markets.

Emerging Winners

Some of the early platforms that industry analysts consider to have the greatest likelihood of achieving sufficient liquidity, and subsequently, widespread adoption, are:

- Market Axess (multi-dealer)
- BondBook (multi-dealer)
- TradeWeb (multi-dealer)
- Cantor Exchange (interdealer)

Market Axess

[Market Axess](#) is a joint venture backed by large dealers such as JP Morgan, ABN AMRO, Deutsche Bank, Chase Manhattan, UBS PaineWebber, Bear Stearns, Lehman Brothers and CS First Boston. The system enables institutional investors to trade in US investment grade and high yield corporate bonds, agencies, municipals, Eurobonds, high yield Eurobonds, and

Euro-denominated emerging market debt. The founding members control a combined 40% of the trading volume (electronic and traditional) in these securities.

The system enables institutional investors to solicit bids and offers from selected dealers. Users of the platform can only view the identities of counterparties relevant to the transaction they're engaged in. They cannot see a complete listing of what others are trading.

Market Axess acquired TradingEdge in January 2001. An owner of Market Axess, CS First Boston, was the merger advisor to TradingEdge. This acquisition added 500 institutional investor users, \$10 billion in inventory, over 40,000 research reports and an anonymous trading system to Market Axess. In February of 2001, Bank of America Securities took an equity stake in Market Axess.

Bond Book

BondBook was announced in mid-July 2000 and was scheduled to become operational by the end of 2000. It is jointly owned by four of the largest dealers on Wall Street: Goldman Sachs, Merrill Lynch, Morgan Stanley (Dean Witter) and Salomon Smith Barney. Deutsche Bank joined as a founding equity partner in September of 2000. This platform enables institutional investors to trade in investment grade and high yield corporate bonds. The owners have committed significant capital to guarantee liquidity in these markets and promised to move substantial business onto the platform, including the sale of new issuances. These five firms were responsible for \$1.7 trillion in new issue volume in 1999, this supply has the potential to attract significant investor interest.

BondBook provides an anonymous, live-bid and offer trading system open to any institutional investor who meets BondBook's credit and user qualifications. This system displays historical prices and allows for direct trading, enabling investors to trade with other investors without any dealer involvement.

TradeWeb LLC

TradeWeb is a multi-dealer system that began in January of 1998. It was founded by Jim Toffey (T'88) to enable institutional investors to trade in U.S. treasuries. It has since added agency securities and Euro-sovereign bonds. The network of 15 participating dealers includes most of the largest dealers. Seven of these dealers are owners and board members who determine the rules of the system: Deutsche Bank, Merrill Lynch, Goldman Sachs, Lehman Brothers, CS First Boston, Morgan Stanley, Salomon Smith Barney. Eight of the dealers are non-owners and non-board members: JP Morgan, ABN AMRO, Chase Securities, UBS PaineWebber, Barclay's Capital, Greenwich Capital, Bear Stearns, and Prudential Securities.

TradeWeb's system is accessed either via the Internet or by way of the Bridge Telerate Network (a private information network similar to Bloomberg). It allows customers to solicit bid and offer quotes from multiple dealers as described earlier. Appendix A illustrates typical screens from the TradeWeb system.

As of January 2001, TradeWeb has a customer base of nearly 650 buy-side institutional clients which it charges a \$100 monthly user fee. Additionally, TradeWeb charges its non-board member banks between \$1.5 and \$2 million per year to list their inventory on the site. TradeWeb executes over \$7 billion in daily trading volume. The industry price per trade is falling, and may be as low as \$5 per million, according to *Euromoney* (December, 2000, p.23).

Cantor Exchange

[Cantor Exchange](#) is an interdealer electronic marketplace that began as a division of Cantor Fitzgerald, a traditional interdealer that invested \$200 million over a three-year period to develop a technology and pricing engine to power what has become the largest US treasury wholesaler, available 24/7 on the Internet and through a proprietary global redundant network distribution system. Cantor Exchange has since expanded into over 40 financial markets, including corporate bonds, agency securities, US treasury futures, non-U.S. G-7 government bonds, Eurobonds, U.K. gilts, emerging-market securities, as well as U.S., European and other repurchase agreements and municipal securities.

The system allows customers to execute transactions and trading strategies in multiple products across multiple markets simultaneously. Transactions are processed using a proprietary, cross-matching, rules-based trading method that executes the orders. Cantor Fitzgerald contributed its software to [eSpeed](#) in connection with eSpeed's public offering in 1999. eSpeed is a provider of B2B exchange technology and solutions for non-financial markets. Cantor Exchange is now powered by eSpeed technology and incorporates customizable compliance and credit risk management features that continuously monitor trading activity. This monitoring ensures that credit limits have not been exceeded and evaluates positions and risk exposure across products.

Looming Challenges for Goldman Sachs

Looking at all of these changes, John Tormondsen is pondering the impact on his traditional bond trading business and his strategy for electronic trading. What will happen to his traditional strongholds in selected fixed income trading markets? Does his strategy make sense for the electronic trading world? Does it just destroy the value provided by his traditional sales/traders? Where will value migrate and profits be possible in the fixed income market? Should he continue to push for the expensive investment needed in electronic trading and what should he do to revitalize or defend his high-margin traditional services?

His decisions are complicated by several factors inside his industry and outside his control. One dilemma he faces is the slow adoption and relatively low volume in some electronic markets. This causes one to ponder whether "fools rush in" too quickly. Yet, at the same time, yielding first mover advantage to another player could be devastating due to the costs and time required to build an electronic presence. In addition, many traders like the convenience of centralized electronic tools because they won't put up with bouncing from screen to

screen and prefer one-stop trading and execution. Does this make electronic trading inevitable and fatal or merely a new convenience for customers and traders alike?

Potential regulation could also become a problem. Historically, fixed-income markets have been largely self-regulated. Though monitored closely by the Federal Reserve and the Securities and Exchange Commission (SEC), trading activity is, for the most part, left to function on its own. However, in November of 2000, the Department of Justice made “civil investigative demands” of the emerging leaders in electronic trading to assess the competitive effect of consortium-based systems on the bond market and to determine if these trading ventures might encourage unjust price collusion.

Case Questions

1. What are the objectives and emerging strategies in the development of electronic trading systems?
2. What will the surviving trading systems do to the traditional telephone-based trading environment with respect to products, players, and their functions?
3. What will the role of voice-based dealers be in the future? Who will be their main competitors?
4. What are the implications for the generic strategy adopted by a traditional telephone-based dealer like Goldman Sachs?
5. Based on your answers to the questions above, what will the pattern of the value migration be in the fixed income market? Will it be the same in all parts of the market? Why?

Appendix A: Sample TradeWeb Screens

TradeWeb v 3.93 - Production System

File Bookmark Composite Dealers Analytics SecList Msg Help

One Sec 1Sec

COMPOTR

TradeWeb Composite On The Run Treasury

Coupon	Mty	Price	Dealer	Yield	Coupon	Mty	Price	Dealer	Yield
6.375	402	100-211/212	2-2	5.874-871	5.625	508	100-136/14	BS-MS	5.553-552
6.625	502	101-027/033	2-GS	5.849-838	4.750	N08	94-292/29+	3-MS	5.550-548
6.375	602	100-261/265	3-2	5.821-810	5.500	509	99-19+/195	2-MS	5.558-557
6.250	702	100-232/23+	2-2	5.778-773	6.000	809	102-292/293	BC-MS	5.571-571
6.125	802	100-19+/197	3-3	5.745-738	6.500	210	106-191/193	2-2	5.572-571
6.000	902	100-173/175	DB-GS	5.676-672	5.750	810	101-232/233	2-MS	5.516-516
5.750	002	100-042/04+	3-5	5.672-668					
5.625	N02	100-00+/006	3-7	5.616-612	6.125	N27	104-23+/245	2-DB	5.776-774
					5.500	828	96-16 /175	2-SB	5.754-750
5.250	803	99-027/031	2-2	5.615-612	5.250	N28	93-05+/065	2-MS	5.743-741
4.250	N03	96-09+/10	5-4	5.630-624	5.250	229	93-10 /112	3-LB	5.730-727
4.750	204	97-162/16+	2-JP	5.609-607	6.125	829	105-281/29+	ML-DB	5.706-703
5.250	504	98-287/29	MS-2	5.603-602	6.250	530	108-216/22	SB-ML	5.642-641
6.000	804	101-107/111	SB-BS	5.591-589					
5.875	N04	101-005/01	6-JP	5.583-579	3mo	03/01	6.0400-0350	4-3	6.215-209
6.750	505	104-227/23	MS-2	5.538-537	6mo	05/31	5.9200-9150	5-3	6.183-178
5.750	N05	101-08+/086	7-6	5.454-452	1yr	11/29	5.5950-5900	4-2	5.922-917

OTR Bills Swaps Strips 0-1 1-2 2-5 5-15 15-29 29-30

< > Main Trsy Agcy Euvr Tkt Blot Book Msg Calc Chart Pref

Appendix A: Sample TradeWeb Screens (continued)

