

European Bond Pricing Sources and Services: Implications for Price Transparency in the European Bond Market

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1. Introduction and Background

The valuation of equity securities depends in large part on what purchasers are willing to pay for them. Although the value of bonds is more easily determined — being a function of the present value of the future payment stream of principal and interest on the bonds and the credit quality of the issuer — whether this simple valuation formula produces an accurate valuation depends on the type of bond and the market’s perception of its liquidity. In addition, most bonds (including listed bonds) trade over-the-counter. There is therefore more fragmentation of information on bond prices than on exchange-traded equity prices. Thus, there is great interest in the availability of bond price data, especially in the U.S. and Europe. In the U.S., systems now exist that provide real-time dissemination of Treasury, municipal and corporate bond trade prices. (A summary of the North American experience is provided Annex E.) In Europe, the Market in Financial Instruments Directive (MiFID) is requiring pre- and post-trade transparency for shares, and the European Commission will be evaluating the extension of such requirements to instruments other than shares. (A summary of the MiFID price transparency provisions is provided in Annex D.)¹

The Bond Market Association (TBMA) and the European Primary Dealers Association (a division of TBMA) believe that, before policy is formulated with respect to pre- and post-trade price transparency in the European bond markets, regulators and market participants should examine the transparency of existing trade execution mechanisms and bond price data dissemination networks in Europe as well as the effect of transparency on liquidity. TBMA has therefore undertaken this study in order to shed light on existing sources of price transparency. The study focuses on Government and corporate bond pricing sources and services and attempts to (i) compile existing sources of pre- and post-trade bond pricing information and services which are available through electronic trading platforms² and data vendor operations in Europe, and (ii) determine which investors have access to such information, how quickly and, if possible, at what cost.

The methodology used for this research is set out in Annex A.

2. Executive Summary

2.1 Electronic Trading Platforms in Europe

- Electronic trading platforms are online systems that facilitate price discovery and trade execution in bonds and other fixed-income instruments. They may either be dealer-to-dealer (or “B2B”) platforms or dealer-to-customer (or “B2C”) platforms, which include single dealer (i.e., investment bank) systems. B2B platforms tend to service the Government bond market, whilst B2C systems are equally divided between the Government and corporate bond space.
- Virtually all trading platforms provide trading participants with post-trade pricing services, pre-trade analytics and research.
- Single dealer platforms account for a large part of the B2C market. Virtually every bank has a single dealer platform through which customers can purchase and, in some cases, sell securities. Although single dealer platforms are used to offer the inventory of a single dealer, the information provided by single dealer platforms directly or through data vendors contributes to the available information used by investors for price discovery, transparency and assurance of “best” execution.³

¹ Note also IOSCO’s May 2004 and March 2005 reports on, respectively, “Transparency Of Corporate Bond Markets” (<http://www.iosco.org/pubdocs/pdf/IOSCOPD168.pdf>), and “Strengthening Capital Markets Against Financial Fraud” (<http://www.iosco.org/pubdocs/pdf/IOSCOPD192.pdf>), pages 18-22.

² Most bond trading in Euro-zone Government bonds, and a growing portion of EU corporate bond trading, is conducted on e-trading platforms (see “Scale of Electronic Trading” on page 6).

³ Best execution generally involves routing an order to the best venue for execution. The concept does work well in the bond markets, where the firms act as dealers rather than brokers, orders are trades rather than “market” or “limit” orders, and venues are individual dealers and trading platforms which may require a relationship with individual dealers. The duty of best execution in the debt markets is generally thought to include the obligation of a broker to seek the most favorable terms reasonably available under the circumstances, and the obligation of a dealer to quote a price that is reasonably related to prevailing market prices.

- Although single dealer platforms will continue to be a presence, multi-dealer B2C platforms will continue to grow in importance and are likely eventually to become the dominant B2C trading systems.
- After several years of rapid growth, the number of multi-dealer B2B and B2C platforms is still growing and is expected to continue to grow, though at a slower pace, as the trading platform industry goes through transformation and consolidation. Not only are there a significant number of electronic platforms but they also account for a large percentage of trades — in particular in the Government and high-grade bond markets.
- The portion of trades conducted electronically depends on a number of factors, the most important of which are the degree of commoditisation and the price volatility of the particular product. For bonds with lower ratings, highly structured cash flows, unique features and large block trades, the percentage conducted electronically declines.
- Although the European bond market is predominantly institutional in terms of trade volume, retail trades account for the majority in number of bond transactions, a phenomenon similar to that in the U.S. Most trades conducted by dealers on behalf of retail customers are via electronic platforms. The trading methodology in the retail sector is much the same as in the institutional sector, as many of the same trading platforms are used.
- Observations:
 1. Only dealers and institutional investors are participants on platforms, but pricing information is often accessible to non-participants and, in some limited cases, retail investors as well.
 2. Trading platforms allow trading in a large number of bonds across a broad number of bond sectors, including corporate, Government and emerging market.
 3. A generally significant number of price contributors⁴ to trading platforms provide liquidity and price discovery.
 4. Two-way pre-trade prices are systematically available to and executable by participants on trading platforms that use a cross-matching, or a firm quote trading method. This is the case with all B2B platforms and some B2C platforms. Many B2C platforms, however, operate solely through a request for quote method. The requesting customer is able to see two-way indicative quotes or last trade prices prior to making the bid request and to execute one-sided prices obtained from several dealers.
 5. Most platforms publish real-time post-trade data, which is available free of charge to platform participants.
 6. Some platforms sell post-trade data to non-participants, and most platforms trade prices are accessible through financial data distribution networks.
 7. Platforms also provide significant non-price information.

2.2 Market Data Vendors in Europe

- Market data vendors are enterprises that offer current bond prices and related bond information and data but generally not trade execution services. The market data industry, like the platform industry, is going through transformation and growth.
- Nine market vendors⁵ may be characterised as large and important, with additional smaller vendors also offering bond price information.
- Observations:
 1. There is no restriction on access to market data vendor information, though there is typically a cost, which may be prohibitive to the retail investor.
 2. Vendors offer a good deal of analytical information in addition to price data.
 3. Vendors make available pre- and post-trade price information from numerous sources, including

⁴ “Price contributors”, also referred to as “liquidity providers”, are dealers that are willing or (if under a market making obligation) committed to provide bid and offer prices in the securities traded on a multi-dealer platform.

⁵ The names of the vendors are provided in Table 3.

electronic platforms, exchanges, dealers and price developers.⁶ Several vendors carry a substantial number of sources. Pre-trade price information is indicative (except where a vendor allows access to a specific dealer page which may carry some executable prices). Post-trade information is obtained from ISMA-TRAX data, platforms and exchanges.

4. Vendors frequently update their financial data.
5. Vendors provide information across several bond market sectors, including Government, investment-grade and high-yield corporate, emerging market and ABS.

2.3 Concluding Observations

- Electronic trading between dealers and with institutional investors is an increasingly important component of the European bond markets. Most of the Government bond market and a growing proportion of the corporate (in particular high-grade) bond markets trade electronically. This trend is only expected to increase as (i) trading platforms compete for greater liquidity in existing, but also additional, products and sectors, and (ii) improved technology allows platforms to develop integrated systems offering “the whole value chain” (trading, clearance, settlement and real-time price dissemination), thereby reducing transaction costs.
- Participants in trading platforms are generally able to view and compare quotes, some of which are executable by participants who are accepted customers of the dealers, and some of which are indicative. This pre-trade transparency facilitates both competitive pricing and investors’ ability to execute at the best available price from those provided by the dealers on a multi-dealer platform.
- Pre-trade prices are often made available to non-platform participants via distribution networks, but on an indicative basis and at a cost.
- Well established pre-trade price transparency exists for approved customers of most of multiple dealers on dealer to customer trading platforms. This is particularly true with respect to European Government and high-grade bonds, but less so as one comes down the credit curve.
- There is, however, little pre-trade price visibility for the retail investor.
- Post-trade bond price information is also widely available to trading platform participants on a real-time, slight delay or end-of-day basis. Some trading platforms, as regulated markets, must report certain trades to their local regulator. Post-trade prices in approximately 11,000 corporate bonds are also reported to various European regulators via ISMA’s TRAX system on a next day basis.
- Trading platforms often distribute post-trade data to data vendors that publish such data on a real-time, slight delay or end-of-day basis. In addition, data vendors provide analytical information, research and evaluation services which greatly contribute to better investment decision making.
- A great deal of post-trade price transparency exists in the European Government and high-grade corporate bond markets for the institutional investor and, to some extent, the regulators as well. A certain level of post-trade price information is also accessible to retail. However, this information is available on a more delayed, not very user-friendly basis, on a more limited number of bonds and at a cost (though several platforms do make post-trade prices available free of charge on their Web site on a delayed basis).

2.4 Issues for Industry Participants

Why Regulate?

- Is it to address the failure by market participants to provide additional price transparency in certain sectors of the bond market?

⁶“Price developer” refers to a pricing source that collects contributed prices and converts them into a price that is indicative of a bond’s market price. Examples are ISMA and the International Index Company, (IIC) which publish pre-trade consolidated prices.

- Is it to reduce the risk of market abuse or market manipulation being committed and does this risk result from insufficient price transparency?
- Is it to reduce the risk of misconduct by certain issuers that have, through the misuse of financial structures, caused losses to bond investors?
- Is it to allow the investor community, and in particular retail investors, to make better informed trading decisions?
- Can all or some of these issues only be addressed through regulatory intervention? Is a new regulated price transparency regime necessary or would certain of these issues be better addressed through the strengthening of existing regulatory frameworks relating, for example, to issuer financial disclosure, corporate governance, accounting practices, best execution and/or market abuse?
- What has been the market response to date? Should market participants be allowed to continue to drive the evolution of what data is available, to whom, how quickly and at what cost?

What Bond Sectors?

- Is additional pre- and post-trade price transparency feasible over and above what is currently provided in the most actively traded bonds (i.e. Government and high-grade bonds)?
- Will forcing more dealers to provide and publish firm quotes lead to distorted or artificial liquidity in already liquid markets? In less liquid or in structured markets, will excessive price transparency discourage market making and prevent the further development of liquidity?
- Do investors need pre- and post-trade price transparency in all bonds (along the lines of the U.S. model) or only in the most actively traded bonds in which retail investors are most likely to invest (along the lines of the Canadian model)?

Which Investors?

- Do institutional investors receive sufficient price transparency? Are dealers, platforms and vendors showing initiative to continue to provide increased price transparency?
- What level of price transparency is useful to retail investors? Is it pre-trade quotes or actual prices? Is it trade prices of institutional blocks or retail size blocks? Is it trade prices on every product or the most frequently traded ones?
- What are the actual needs of retail, mostly “buy and hold”, investors? In selecting an investment, would the retail investor benefit more from an ability to obtain real-time prices or from an ability to compare yields in all markets to determine the investment yield (and price) that meets their risk profile in terms of currency, maturity, interest rate and credit quality?
- In other words, what is the best way to educate retail investors to the risks and benefits of investing in bonds and to ensure that when they make an investment, they benefit from appropriate best execution practices and are protected by a suitability regime?
- Should market participants voluntarily sponsor an initiative that makes relevant price information available free of charge and in a form suitable for retail investors? Should regulators mandate such a system, at the expense of either taxpayers or market participants?
- Which data can be made available free of charge to the retail investor community, without impacting the business model that currently exists around the pre- and post-trade prices provided to institutional customers by dealers, platforms and vendors?

Conclusion

- The European bond markets have made significant progress in the provision of pre- and post-trade price transparency.
- Market participants will need to work closely with the regulators to ensure that there is continuous progress in addressing the appropriate level of institutional price transparency across the respective bond market sectors.

- The market and its regulators should also establish a framework for providing bond market education and price and yield transparency for the European retail investor community. As bond investments become increasingly important for retail investors both directly and indirectly via their pension fund providers and other savings products, these efforts should take priority.
- Developing answers to the questions noted above will help ensure that any policy on price transparency is properly formulated and that the European bond markets continue to grow.

3. Electronic Trading Platforms⁷ in Europe

3.1 Terms and Definitions

Electronic trading platforms are online systems that facilitate price discovery and trade execution in bonds and other fixed-income instruments. TBMA publishes an annual review of existing electronic trading platforms in Europe and the U.S. and the services they provide.⁸ The methodology in this section follows the methodology used in TBMA's *2004 eCommerce Review*.

The *2004 Review* identified several types of platforms: single dealer (i.e., investment banks' own systems), multi-dealer-to-dealer platforms (also known as interdealer platforms, or B2B), and multi-dealer-to-customer platforms (also known as B2C).

The B2B systems generally operate via cross matching methods — i.e., those in which customers are able to enter anonymous buy and sell orders that are automatically executed when another party's buy and sell orders are entered at the same price or when the bid is “hit”, or the offer “lifted.”

The B2C systems most often operate through a request for quote system (and some use a firm quote method). The request for quote system enables dealers to conduct electronic auctions for the sale of securities by posting securities offerings and specific terms with buyers submitting bids for the offered securities, and the offered securities awarded to the highest price or lowest yield submitted.

The request for quote system also enables an investor to send a request for a bid (up to 6, typically), based on seeing and selecting from the best indicative quote, for a specific trade simultaneously to multiple dealers of which it is a customer. Bids of dealers choosing to respond are firm for a specified period of time. They typically are one-side offers to buy or sell. The investor can then choose to execute the trade with any of the responding dealers. In the request for quote, only the requesting party sees the quotations for the trade provided by the dealers.

3.2 General Trends: Growth of Electronic Trading in Europe; Greater Offering of Pricing Services

Activity through electronic trading platforms in Europe has been growing in recent years and continues to grow.

3.2.1 Single Dealer Platforms

Virtually all major bond dealers operating in Europe offer systems through which customers can purchase securities from the dealer's inventory. These platforms are provided as stand-alone systems or through market information vendors such as Bloomberg. They facilitate information sharing between the dealer and its customers and present offering prices and analytical data such as spreads, yields, and bond terms and conditions, typically including volume information, except in the case of very large block trades.

Although single dealer systems are primarily used to sell the inventory of a single dealer, and prices represent the prices of a single dealer, the information provided by single bank platforms contributes to the available

⁷ The terms “electronic trading system” and “platform” are used interchangeably. The term “multi-dealer platform” refers generally to all platforms in which more than one dealer facilitates trades; it encompasses interdealer and dealer-to-customer systems. The term “single-dealer platform” refers to platforms operated by a single dealer.

⁸ The Bond Market Association, *eCommerce in the Fixed-Income Markets: The 2004 Review of Electronic Transaction Systems* (December 2004) (hereinafter, *TBMA 2004 eCommerce Review*) available at http://www.bondmarkets.com/assets/files/Electronic_Trading_Survey_1204.pdf.

information used by investors for price discovery, transparency and the assurance of “best” execution, especially for smaller odd-lot trades. As one bank indicated, “If an investor has four to five bank relationships, the investor has (essentially) full price transparency and should have the necessary information to determine best execution.”

Single dealer platforms still account for a large part of the B2C market. For instance, an October 2004 Celent Communications study found that about 32 percent of bond trading volume in the B2C market was conducted through single dealer systems.⁹ Multi-dealer platforms, though, are increasing their market share of the B2C space.

3.2.2 Multi-Dealer Platforms

Sources interviewed by TBMA indicated that although single dealer electronic trading systems will continue to have a presence in European fixed-income markets, the multi-dealer platforms will grow in importance in the European fixed-income market and become the dominant trading systems for B2C European bond trading. This evolution is similar to the development of electronic trading in the U.S. where separate single dealer systems were in essence aggregated and evolved into multi-dealer B2C systems.

After several years of rapid growth, the number of platforms is still growing and is expected to continue to grow, though at a slower pace, as the trading platform industry goes through transformation and consolidation. Table 1 shows the number of multi-dealer B2B and B2C trading systems serving the European corporate and Government markets (as well as those serving the U.S. corporate and Government markets) in 2003 and 2004. As can also be observed, B2B platforms tend to service primarily the Government bond market, whilst the B2C platforms are evenly divided between Government and corporate bond markets. There are at least 23 multi-dealer platforms in Europe covering the government and corporate bond markets, of which 14¹⁰ trade Government bonds exclusively, one trades only corporate bonds, and 8 trade both Government and corporate bonds.

TABLE 1 CORPORATE AND GOVERNMENT MULTI-DEALER ELECTRONIC TRADING PLATFORMS				
	CORPORATE		GOVERNMENT	
	EUROPE	US	EUROPE	US
2003				
Multi-Dealer to Customer	6	13	9	11
Multi-Dealer to Dealer	2	2	13	3
2004				
Multi-Dealer to Customer	7	12	8	11
Multi-Dealer to Dealer	3	2	14	3

Source: The Bond Market Association

3.2.3 Price Services

Virtually all of these platforms provide trading participants with post-trade pricing services; that is, access to a pricing database of all trades executed on the system and, in some cases, trades executed through other media as well.

In addition, it is common, especially for B2C electronic trading systems, to also offer pre-trade analytics (access to research, data and analytical functions to develop or test trade ideas before execution) and research content (research products produced by dealers or third-party providers) to support the price discovery and evaluation process.

3.2.4 Scale of Electronic Trading

Not only is there a significant number of electronic trading systems in Europe, but a large percentage of trades are conducted electronically. The percentage of trades executed electronically, including trades on both multi-dealer and single dealer platforms, depends on several factors. The most important of these are the degree to which a particular product is commoditised and the volatility of the product. Factors which promote electronic execution, therefore, include investment grade ratings, large issue sizes, active issuers, predictable cash flows, small-to-medium trade sizes and overall trading volume. Based on interviews conducted for this study, within the institutional investor sector, TBMA estimates that approximately 80 percent of Government

⁹ Celent Communications, 2004, *Electronic Trading in European Fixed Income Markets*.

¹⁰ TBMA 2006 *eCommerce Review* counts each of the 11 European MTS trading platforms as a separate platform; that same methodology applies to Table 1.

bond trades are conducted electronically both in number of transactions and volume terms.¹¹ For the rest of the bond market, there is a less overall visibility. For bonds with lower ratings, highly structured cash flows, or other unique features, the percentage of trades done electronically declines. As one comes down the credit curve, the average ticket size goes down and the number of trades goes up. Although a significant and growing number of corporate bonds trade electronically, in volume terms, the vast majority are still done by voice. Based on interviews conducted for this study, especially the non-Government large block trades and more volatile bond trades are executed by voice, not so much because the platforms do not have the technology to accommodate them, or because investors believe they may obtain better pricing, but rather because of dealer capital commitment and risk management considerations. For such trades, customers making an electronic inquiry are instructed that they can contact a dealer for a full “Request for Quote”, or RFQ.

3.2.5 Institutional and Retail Market Sectors Compared

The European bond market is still predominately institutional, although the retail market is generally larger in Europe than in the U.S. Based on interviews conducted for this report, within Europe, the retail market is more prominent in certain countries than others. While, for example, the UK market is highly institutional, there is a larger retail presence in Germany, Italy, Switzerland and the Benelux countries.

In Europe, the retail sector is estimated to account for the majority of the number of trades, but the institutional sector accounts for the majority of trading volume.¹² Again based on interviews conducted for this report, most retail trades in terms of both number of trades and trading volume are executed electronically by banks on behalf of clients, especially in the case of higher quality bonds. However, the interaction between retail customers and their bank representatives is predominantly by voice. As with institutional trades, in the case of lower rated issues, voice trades are more common.

The trading methodology in the retail sector is generally similar to that in the institutional market, as the same trading systems that execute the institutional trade can be and are used to facilitate retail sized trades. Along with single dealer platforms, the TradeWeb platform, for example, is used by banks to fulfill and execute retail Government bond trades, and Bloomberg is the dominant vehicle for banks to execute smaller retail-size corporate bond trades. Banks search Bloomberg to identify the best indicative price quote and, once identified, place a request for quote and execution of the trade. Reuters, however, has accelerated efforts to compete with Bloomberg and, in late February, introduced its Reuters Trading for Fixed Income, which supports trading models for both single dealer and multi-dealer trading.

Dealers execute retail trades not only on behalf of their own clients but also with regional, smaller or private banks for whom the retail customers represent a more substantial portion of their business. The dealers often provide the regional bank with executable prices.

3.3 Summary Tables of E-Trading Platforms

Tables 2A and 2B below present a summary of characteristics of, access to and pricing information available through the leading multi-dealer electronic B2B and B2C trading platforms in Europe. (Similar aspects of single dealer platforms are summarised in one generic single platform row at the bottom of each B2C table). The observations that follow the tables are organised to correspond with the order of presentation of the information in the tables. More detailed descriptions of the multi-dealer platforms may be found in Annex B.

¹¹ The above-mentioned Celent Communications study found that about 70 percent of all Government trades are conducted electronically.

¹² The comments on the relative share of number of trades and trade volume between retail and institutional sectors were based on interviews. The interviews indicated that the relative retail share in Europe is about the same whether one defines retail by trade size or as individual investors. In the U.S., retail-sized trades (under \$100,000) constitute 65 percent of the total and 1.8 percent of the value of all trades of corporate bonds.

TABLE 2A ELECTRONIC TRADING PLATFORM CHARACTERISTICS & PRICING SERVICES

PLATFORM NAME	TYPE OF SYSTEM	TRADING METHOD	TRADING PLATFORM PARTICIPANTS	EUROPEAN SECTOR COVERAGE (NUMBER OF BONDS)	MINIMUM TRADING SIZE	AVERAGE DAILY TURNOVER	PRICE CONTRIBUTORS
eSpeed, Inc.	Multidealer B2B	Cross-matching	Dealer	G, IG, HY, A, S, O	\$1 million increments	N/A	Dealers
Eurex Bonds	Multidealer B2B	Cross-matching	Dealer	G, IG, A, S, O	€1 million for bonds	€486 million in German Gov Bonds in 2004	31 Dealers, including 18 Market makers
ICAP (BrokerTec and ETC)	Multidealer B2B	Cross-matching & Voice	Dealer	G, A, S, IG, O - (500-600 European Gov bonds)	€1 million	Over \$450 billion in 2005 – all markets	68 Dealers
MTS Group ¹	Multidealer B2B	Firm quotes ²	Dealer	G, A, S, O - (650+ bonds)	Varies for individual MTS platforms	€25 billion for cash markets ³	350 Market makers
Bloomberg BondTrader	Multidealer B2C	Firm quotes & Request for quotes	Dealer Buy-Side	G, A, S	N/A	\$5 billion	94 Dealers
ALLQ ⁴	Multidealer B2C	Firm quotes & Request for quotes	Dealer Buy-Side	G, IG, HY, A, S, EM, O	N/A	N/A	94 Dealers
Bondscape	Multidealer B2C	Firm quotes	Buy-Side ⁵	G, IG, A, O - (350+ bonds)	No	N/A	3 Market makers
BondVision	Multidealer B2C	Request for quotes	Dealer Buy-Side	G, IG, A, S, O - (900+ bonds)	100,000 for gov and 1,000 for others – any currency	€3 billion	33 Dealers
MOT ⁶	Multidealer B2C	Cross-matching	Dealer Buy-Side	G, IG	N/A	N/A	N/A
Market Axess Holdings Inc.	Multidealer B2C	Request for quotes	Dealer Buy-Side	IG, A, S, O	N/A	\$306 million for European IG	22 Broker-Dealers
Reuters Trading	Multidealer B2C	Firm quotes & Request for quotes	Dealer Buy-Side	G, IG, HY, A, S, EM, O (12,500+ bonds)	No	N/A	6 Dealers ⁷
SWX Swiss Exchange	Multidealer B2C Exchange	Cross-matching	Dealer Buy-Side	G, IG, HY, A, S, EM, O - (3,600+ bonds)	Smallest tradable unit	CHF1 billion in 2004 ⁸	7 Market makers
TLX Euro	Multidealer B2C	Cross-matching	Dealer Buy-Side	G, IG, HY, A, S, EM – (150+ IG/HY; 250 G; 100 S)	No	€55 million	40 Dealers 1 Market maker
TradeWeb	Multidealer B2C	Request for quotes	Dealer Buy-Side	G, A, S - (350+ G)	Minimum lot size	€8 billion	26 Market makers
Generic Single Dealer	Single Dealer B2C	Varies	Dealer Buy-Side	G, IG, HY, A, S, EM, O	N/A	N/A	1 Dealer

¹ Includes 11 MTS fixed-income trading platforms.

² Firm quotes for cash markets; cross-matching for repos and basis instruments.

³ €25 billion for cash markets and €60 billion for repos.

⁴ In addition and separate from BondTrader, Bloomberg makes available its ALLQ (all quotes) function from which price quotes provided by dealer contributors can be viewed. Depending on the price contributor, the quotes may be firm or indicative. If firm, the quote can be hit as long as it is seen on the screen. The ALLQ function is available for the broad array of market sectors, including investment grade, high-yield and emerging market.

⁵ Bondscape trading system is used by brokers and investment advisors.

⁶ Not interviewed

⁷ Reuters Trading indicates that 9 additional dealers will join later in 2005

⁸ Includes Swiss and foreign bonds

Buy-Side: institutional investors

G: Government **IG:** Corporate Investment-Grade **HY:** Corporate High-Yield **A:** Agency **S:** Supranational **EM:** Emerging Markets **O:** Other markets **N/A:** Not Available

TABLE 2B ELECTRONIC TRADING PLATFORM PRICING SERVICES

PLATFORM NAME	PRE-TRADE PRICES	POST-TRADE PRICES	PRICING DATA COST	SALE OF PRICING DATA (NON-PARTICIPANTS AND NON-VENDORS)	COST OF PRICING DATA (NON-PARTICIPANTS AND NON-VENDORS)	PRICING DATA DISTRIBUTED BY VENDORS	NON-PRICE INFORMATION
eSpeed, Inc.	Executable	Real Time	Free to participants	Through related party ¹	N/A ¹	No ¹	Yes
Eurex Bonds	Executable	Real Time	Free to participants	Through related party ²	N/A ²	Real time ²	Yes
ICAP (BrokerTec and ETC)	Executable	Real Time	Free to participants	No (Except U.S. Treasuries)	Not applicable	No ³	Yes
MTS Group ⁴	Executable	Real Time; Free at the end of the day on Web site	Free to participants; Free end of day to general public	No	Not applicable	Real time	Yes
Bloomberg BondTrader	Executable & Indicative	Real Time	Free to participants	Dealer, Buy-side	License fee	No	Yes
ALLQ	Executable & Indicative	Real Time	N/A	N/A	N/A	No	Yes
Bondscape	Executable	Closing prices—end of day on Web site	Free to participants; Free end of day to general public	No	Not applicable	No	Yes
BondVision	Last traded prices only ⁵	Real Time	Free to participants	No	Not applicable	No	Yes
MOT ⁶	N/A	N/A	N/A	N/A	N/A	N/A	Yes
Market Axess Holdings Inc.	Indicative	Real Time	Free to participants	No	Not applicable	No	Yes
Reuters Trading	Executable & Indicative	Real Time	Free to participants	No	Not applicable	No	Yes
SWX Swiss Exchange	Executable	Real time for dealers and buy-side; Delayed 30 minutes on Web site	Free to participants; Free to public after 30 minutes	Dealer, buy-side	User-based fee	Real time	Yes
TLX Euro	Executable	Real Time on Web site	Free	No	Not Applicable	Real time	Yes
TradeWeb	Indicative	Delayed 15 min	Free to participants	Dealer, buy-side	Per product fee	Real time	Yes
Generic Single Dealer	Executable & Indicative	Depends on system	Free to participants	N/A	N/A	Real time	Yes

¹ eSpeed data are disseminated by Cantor Market Data, a division of Cantor Fitzgerald, through third-party vendors

² Eurex Bonds data are disseminated by Market Data & Analytics, a division of Deutsche Börse Group

³ U.S. Treasuries available through Telerate

⁴ Includes 11 individual MTS fixed income trading platforms

⁵ Pre-trade prices are available on "Best Page" and are last traded prices

⁶ Not interviewed

3.4 Observations

Only dealers and institutional investors are trading participants on the platforms: Trading on electronic platforms is either exclusively interdealer (in the case of B2B platforms) or dealer to institutional investor (in the case of B2C platforms). However, pre- and post-trade pricing information generated by the platforms is often accessible by non-trading participants, and therefore more broadly available. In some cases, pricing information is also accessible to retail investors, e.g., the SWX Swiss Exchange and TLX Euro.

Broad sector coverage and depth of trading: Electronic trading platforms execute trades across the spectrum of bond sectors, including Government, investment-grade, high-yield and emerging market bonds. Some platforms specialise in Government bonds (more often the case with B2B systems), others offer trading in a number of market sectors. There is a significant level of activity on the trading platforms, based on information from those platforms that disclose such data. The number of bonds traded range from several hundred to over 10,000 depending on the platform, and daily volume is in the range of billions of euros.

Significant number of price contributors: The number of participating dealers varies greatly depending on the platform. Dealers participating in some of the trading platforms also have market making obligations in all or a subset of the bonds traded on the platform. The greater the number of price contributors, the greater the liquidity provided by the platform and the more transparent the price discovery process.

Two-way pre-trade prices are commonly available, comparable, and sometimes executable: Two-way pre-trade prices are systematically available to and executable by participants on trading platforms that operate via a

cross-matching or a firm quote method, i.e. in the most liquid securities. This is the case with all B2B platforms, and some B2C platforms. As noted, however, many B2C systems also or only operate on a request for quote basis, although indicative pricing or the last-traded price may be available prior to making a bid request. One-sided executable prices are, however, generally available from up to 5 or 6 dealers on RFQ platforms. Quotations on multi-dealer platforms for investment-grade securities in smaller, odd-lot trade sizes — that is, retail trade sizes — are generally executable. Quotations on multi-dealer platforms in non-investment-grade securities and trades of institutional size are more likely to be indicative only (i.e., not tradable). As noted, many multi-dealer platforms have a substantial number of dealers. Consequently, comparative prices are available to the user requesting a bid.

Most platforms publish post-trade prices for trades conducted on their platforms with minimal, if any, delay: With a few rare exceptions, platforms provide post-trade price information to trading participants on a real-time basis or with minimal delay.

Post-trade pricing information is provided free of charge to platform participants: All trading platforms without exception make post-trade data available to their participants at no cost. Some platforms also make such information available to the general public free of charge, but on a delayed basis.

Some platforms sell data to non-participants (non-vendors) at a fee: Some platforms or affiliated entities will sell the pricing data to non-participants at a fee that may be substantial, especially from the retail investor perspective. Platforms view price data sales as a profit center. We were unable to obtain detailed information from the platforms regarding fees charged to non-participants.

Most platform trade prices are accessible through a financial data distribution network: Information from the majority of trading platforms may be accessed not only directly through the platform but also through distribution networks, including Bloomberg, Telekurs, Telerate and Reuters. Such information typically is available immediately, although some platforms offer the information on a delayed basis.

Most platforms provide significant non-price information: Platforms often provide non-price financial data and, in some cases, research and analytical content in addition to trade prices. Examples include yield, duration, coupon, issue size, rating, and bond terms and conditions. Platform architecture often creates database sorting and searching capability for finding comparable bonds. Since older bonds do not trade frequently, prices of comparable bonds are often used as a proxy for current market price.

4. Market Data Vendors in Europe

4.1 Terms, Definitions and General Trends

Market data vendors are enterprises that offer bond prices and related bond information and data, but generally not trade execution services. The market data industry, similar to the platform industry, is experiencing transformation and growth, resulting in expanded investor access to bond price information. Vendors offer data from electronic platforms and other providers of price and market information, and also develop data products based on contributed dealer prices.

The nine market data vendors listed in Table 3 may be characterised as leading or large, with additional smaller, typically regional, data vendors also offering bond price information (see examples in Annex C). The leading vendors generally perform one or both of the following two functions: (1) developers of pricing information, and/or (2) large-scale network distributors of pricing, financial and market information.

The development of pricing information is most clearly exemplified by the International Index Company (IIC)—creator of the iBoxx indices—and the International Securities Market Association (ISMA) ISMA Pricing Services. IIC provides indicative pre-trade consolidated prices which are averages calculated from bank dealer price contributors on bonds that comprise the iBoxx indices. The price consolidation calculation is intended to be a market consensus of the bond's market price. Through ISMA Pricing Services, ISMA publishes both pre-trade consolidated prices (provided by its Council of Reporting Dealers) and reported post-trade prices through its TRAX reporting and matching service. The IIC and ISMA prices are available directly to end-users and also

through distribution networks. (Note that because of ISMA's SRO status, TRAX prices are also reported to certain European regulatory agencies.)

Reuters and Bloomberg are the most prominent examples of large-scale distribution networks. They offer access to dealer information through their dedicated dealer pages,¹³ distribute information from other pricing and market data sources, and develop their own price information based on contributed prices.

The growth of the European bond market has brought additional attention to the European marketplace from market data vendors that provide bond price evaluation services, such as Reuters, S&P (through Telekurs) and FT Interactive Data. Their recent European expansion is in addition to the established and locally based providers of European bond data. The net effect is increased price information available to the European markets.

4.2 Summary Tables of Price Information Available through Market Data Vendors

Tables 3A through 3C summarise the characteristics, price sources and bond market sector coverage of the leading price data vendors. The observations that follow the tables are presented to correspond to the order of presentation in the tables. More detailed descriptions may be found in Annex C.

¹³ Dedicated dealer pages are available to customers "permissioned" by the dealer. Dealers generally exclude other dealers from their pages for competitive reasons.

TABLE 3A SUMMARY TABLE OF LEADING PRICE INFORMATION VENDORS

PRICING SOURCE	ACCESS	APPROXIMATE FEE TO END-USER CUSTOMER	ANALYTICAL NON-PRICE INFORMATION	SOURCE/PROVIDER OF PRICE DATA	DATA UPDATE FREQUENCY
BLOOMBERG	All	€15,000 annually per terminal	Yes	1. Dealer Quotes 2. Consolidated Prices 3. Exchanges 4. iBoxx 5. ISMA (ISMA Pricing Service) 6. Platforms 7. Bloomberg Evaluated Prices	1. Dealer page–Dependent on dealer 2. Intraday 3. Real time or minimal delay 4. See IIC 5. See ISMA 6. Real time or minimal delay 7. Updated if similar bond prices changed
FT INTERACTIVE	All	Varies with level of service	Yes	Evaluated Prices based on proprietary methodology	End of day
IIC (IBOXX)	All	End of day/€1,500 per year direct feed	Yes	Consolidated Prices	Each minute/ available as live feed or end-of-day
ISMA PRICE: BID/OFFER QUOTES (ISMA INFO)	All	Varies with level of service	Yes	Consolidated Prices	End of Day
ISMA PRICE: FROM TRAX	All	Varies with level of service	Yes	ISMA-TRAX	Updated with 30 minute delay; available end of day to all customers
REUTERS	All	€12,000 annually per terminal	Yes	1. Dealer quotes 2. Consolidated Prices 3. Exchanges 4. iBoxx 5. ISMA-TRAX 6. Platforms 7. Reuters Evaluated Prices (EJV)	1. Dependent on dealer; real time/no additional delay 2. Intraday 3. Real time or minimal delay 4. See IIC 5. See ISMA-TRAX 6. Real time or minimal delay 7. Every 10 min for liquid bonds; end of day for infrequently traded bonds
TELEKURS	All	Not available/Per-bond basis for evaluated prices	Yes	1. Dealers 2. Exchanges 3. Platforms 4. Telekurs/S&P Evaluated price	1. Real time 2. Real time or minimal delay 3. Platform schedule 4. Intraday/end-of-day delivery
TELERATE	All	€3,600 to 8,400 annually per terminal	Yes	1. Dealer quotes 2. Consolidated Prices 3. Exchanges 4. iBoxx 5. ISMA-TRAX 6. Platforms 7. Reuters Evaluated Prices (EJV)	1. Dependent on dealer; real time/no additional delay 2. Intraday 3. Real time or minimal delay 4. See IIC 5. See ISMA-TRAX 6. Real time or minimal delay 7. Every 10 min for liquid bonds; end of day for infrequently traded bonds
THOMSON	All	By number of users for terminal product (Datastream) or per-bond basis for direct feed	Yes	1. Dealers 2. Exchanges 3. IIC 4. ISMA (Full ISMA pricing service) 5. TradeWeb 6. FT Interactive Evaluated Prices	1. End-of-day delivery 2. End-of-day delivery 3. See IIC 4. See ISMA 5. Real time 6. End of day

Notes

1. "All" means there is no restriction on type of customer, although information is, generally, available to only subscribers.

2. The two ISMA products are typically offered as a combined service.

3. **Analytical Non-Price Information** refers to the various types of non-price data and information, in addition to current prices, that are available through the vendor, such as bond terms and conditions, issue size, trading volume, rating, coupon, yield, credit spread, price history, duration and convexity. Some offer more sophisticated analytical tools and research, including prebuilt models.

4. **Consolidated prices** generally involve collecting bank dealer price contributions, usually in the form of indicative quotes, subjecting the data to a quality control process on the submissions and performing a mathematical averaging technique on the contributor price submissions. As an alternative to the averaging, vendors may provide the latest quote from any price contributor.

5. **Evaluated prices** involve constructing a model designed to estimate prices of bonds which have not traded (or traded only infrequently) during a given period based on the bonds' key characteristics and on actual market activity. For more information, please refer to Annex E, the FT Interactive Data case study.

6. The Thomson description generally refers to the Datastream product. Thomson also provides price information through its TradeWeb platform which is independent from Datastream. This comment is applicable to all TradeWeb references in Table 3.

TABLE 3B VENDOR PRE- AND POST-TRADE PRICE SOURCES

PRICE DATA VENDOR	PRE-TRADE (NUMBER OF PRICE CONTRIBUTORS)	POST-TRADE
Bloomberg	Consolidated and Dealer pages (94) ISMA (40) IIC (9)	ISMA-TRAX Platforms Exchange
FT Interactive	Not Applicable (evaluated prices)	Not Applicable (evaluated prices)
IIC (iBoxx)	Consolidated (9)	No
ISMA Bid/Offer Quotes (ISMA.info)	Consolidated (40)	No
ISMA -TRAX	No	ISMA-TRAX
Reuters	Consolidated and Dealer quotes (35) IIC (9)	ISMA-TRAX Platforms Exchange
Telerate	Consolidated and Dealer quotes N/A IIC (9)	ISMA-TRAX Platforms Exchange
Telekurs	Dealers (56)	Platforms Exchange
Thomson	Dealers (7) IIC (9) ISMA (40) TradeWeb (26)	ISMA-TRAX Exchange TradeWeb

TABLE 3C VENDOR MARKET COVERAGE AND NUMBER OF BONDS WITH PRICE INFORMATION

PRICE DATA VENDOR	GOVERNMENT (NUMBER OF ISSUES WITH PRICES)	CORPORATE (NUMBER OF ISSUES WITH PRICES)	ABS (NUMBER OF ISSUES WITH PRICES)	EMERGING MARKET (NUMBER OF ISSUES WITH PRICES)
Bloomberg	✓ (6,500)	✓ (48,000)	✓ (N/A)	✓ (1,914)
FT Interactive	✓ (1,035)	✓ (11,053)	✓ (1,055)	✓ (900)
IIC (iBoxx)	✓ (659)	✓ (1,328)	✓ (28)	No
ISMA Bid/Offer Quotes (ISMA.info)	✓ (2,200–3,300)	✓ (7,700–8,800)	✓ (N/A)	✓ (N/A)
ISMA-TRAX	✓ (2,200–3,300)	✓ (7,700–8,800)	✓ (N/A)	✓ (N/A)
Reuters	✓ (3,801)	✓ (25,581)	✓ (638)	✓ (479)
Telekurs	✓ (N/A)	✓ (N/A)	✓ (N/A)	✓ (N/A)
Telerate	✓ (N/A)	✓ (N/A)	✓ (N/A)	✓ (N/A)
Thomson	✓ (15,750)	✓ (44,000)	No	✓ (250)

“N/A” means not available

Reuters estimates that there are 35 bank quotes provided for the most active bonds, which is the number provided in Table 3B. Reuters also indicates that a total of 250 to 300 banks provide quotes on at least some European bonds.

Telerate carries quotes from the leading dealers but does not specify the number of dealers.

ISMA provides ABS prices but the number of issues priced is small. The same comment is relevant to ISMA post-trade data.

ISMA emerging market bond numbers are incorporated in the total Government and corporate numbers. The same comment is relevant to ISMA post-trade data.

4.3 Observations

No restriction on access to information, though there is a cost: Anyone may subscribe to become a customer of a market data vendor and obtain European bond price data. The cost can vary greatly depending on the type of vendor and the services purchased and may be prohibitive to the retail investor. In addition, the data vendor may be able to offer access to dedicated dealers’ individual pages only with dealer permission.

There is a limited number of free or inexpensive sources of information available to retail investors. IIC, for example, publishes an end-of-day pricing service, available free of charge on its Web site; UBS Quotes, available on the publicly accessible portion of the UBS Web site, provides indicative trader quotes and prices from the SWX Swiss Exchange; the SWX Swiss Exchange and the TLX platform publish prices as noted in the “Electronic Trading Platforms in Europe” section. In addition, certain networks have some retail customers; for example, Telerate offers a lower-priced information service which includes bond prices, and Telerate indicates that it has a substantial retail clientele, though there is less data available than on the premium offerings, which include platform prices not available on the lower-priced service.

In addition, anyone with the price of a *Financial Times* (£1 daily and approximately £312 annually) gets a page with end-of-day prices for benchmark government bonds, 21 different UK gilts, the FTSE UK gilts index, 24 dollar-denominated corporate bonds with maturities from 3 months to 25 years, 14 euro-denominated corporate bonds with maturities out to 6 years, 5 yen-denominated corporate bonds with maturities to 10 years, 5 sterling-denominated corporate bonds with maturities out to 6 years, and a number of high-yield and emerging market bonds, denominated in dollars and euro; 10-year government bond spreads for 12 major governments; and bond indices from 5 dealers, iBoxx (IIC) and FTSE.

Non-price analytics important complement to price data: Price data vendors offer a great deal of analytical information in addition to the price data that they make available. This typically takes the form of a standard set of content which may include research, bond terms and conditions, and corporate actions, ratings, historical

trading patterns, the ability to graph and download data into spreadsheets, as well as spreads to sovereigns, swaps and other benchmarks. Some of the vendors go beyond basic data and offer more sophisticated analytical tools, including financial models. These value-added services are an important manner in which price vendors compete. Here again, the vendor fee may prevent retail access; in particular, where the vendor charges a higher fee for non-price data.

Vendors make data available from numerous sources: Several price data vendors provide, distribute and make available information from a wide array of sources through a single integrated network. Depending on the vendor, the information service includes prices from electronic platforms, exchanges, price developers such as IIC and ISMA, bank dealer quotes and evaluated prices.

Frequent price data updates: Much price data is updated on a real-time basis, although the frequency of such updates depends on the timely delivery of price data by the underlying price data provider, as well as on the level of service offered by the data vendor. For example, because bond evaluation-based services fulfill an important function in a product (bonds) that generally trades infrequently and because such evaluation services need the necessary time and quality controls to ensure the accuracy of their valuations, they may only be able to provide updates on an end-of-day basis. In the case of information vendors that publish prices generated by dealers or trading platforms, prices may be available in real time or with a minimal delay. The vendor community indicates that the trend is towards faster update and distribution frequency.

Pre-trade price data availability: Although certain vendor networks, such as Reuters and Bloomberg, present through specific pages individual dealer quotes which may carry some executable prices, pre-trade pricing information is largely based on indicative quotes from dealers and is widely available to subscribers. The quality of the pre-trade price data depends in part on the number of price contributors, and several vendors carry a substantial number of price contributors. Most of the leading vendors also offer consolidated prices.

Post-trade price data availability: Post-trade price information is available from prices generated from ISMA's TRAX trade-matching reporting service, trading platforms and exchanges, either real-time or with minimal delay. (See Frequent Price Data Update above.)

Vendors provide price information across several bond market sectors: There is almost universal coverage among price information providers of prices on Government and high-grade corporate bonds. A significant but smaller number of vendors also provide price data for the high-yield, emerging market and ABS sectors.

5. Concluding Observations

Electronic trading between dealers and with institutional investors is an increasingly important component of the European bond markets. Most of the Government bond markets and a growing proportion of the corporate (in particular high-grade) bond markets trade electronically. This trend is expected to continue to increase as (i) trading platforms compete for greater liquidity in existing, but also additional, products and sectors, and (ii) improved technology allows platforms to develop integrated systems offering “the whole value chain”, including trading, clearance, settlement, and real-time price dissemination (e.g., Eurex Bonds), thereby reducing transaction costs.

Participants in trading platforms are generally able to view and compare quotes, some of which are executable by participants who are accepted customers of the dealers, and some of which are indicative. This pre-trade transparency offered by the trading platforms facilitates both competitive pricing and institutional investors' ability to execute at the best available price from those provided by the dealers on a multi-dealer platform. The large number of dealers that contribute prices to most platforms adds to the transparency and quality of the price discovery process.

Pre-trade prices are also often made available to non-platform participants via distribution networks, but on an indicative basis and at a cost.

There is, therefore, well established pre-trade transparency in the European government and high-grade corporate bond markets for all of the institutional investors that are approved customers of most of the dealers on dealer to customer trading platforms. Pre-trade transparency levels decrease as one comes down the credit curve and most trades are executed by voice.

Restrictions on access to trading platforms and the cost of obtaining price data from data vendors makes pre-trade price information less visible for the retail investor. However, in Europe, most retail investors transact their investments via their bank, which in turn has access to the same electronic trading platforms that the institutional investors have. Therefore, each broker or private client advisor has the tools to obtain “best” execution on behalf of their client. As mentioned above, what the retail investor does not have is the same direct visibility of both indicative and executed prices as the institutional investor.

Post-trade bond price information is also widely available to trading platform participants on a real-time, slight delay or end-of-day basis. Some trading platforms, as regulated markets, must report certain trades to their local regulator. In addition, post-trade prices in approximately 11,000 corporate bonds are reported to UK, French and Belgian regulators via ISMA’s TRAX system on a next day basis.

Furthermore, trading platforms often distribute post-trade bond price data through direct sales or through data vendors that make such data available to subscribers, again on a real-time, slight delay or end-of-day basis. The pricing and format of this data are clearly targeted at the bank and institutional investor customer. However, several platforms do make post-trade prices available free of charge on their Web site on a delayed basis. In addition, information on only the most liquid bonds is available in the financial press on a next day basis.

There is, therefore, a great deal of post-trade price transparency in the European government and high-grade corporate bond markets for institutional investor and, to some extent, the regulator. There is also a certain level of post-trade price information available to the retail investor, though on a more delayed basis, in a not very user friendly format and for a much more limited number of bonds. In general, market forces are continuously providing more post trade transparency, as both platforms and data vendors have a strong commercial incentive to offer services that ensure quality and timeliness of post-and pre-trade price services in a growing number of market segments.

Additionally, data vendors provide analytics and research (developed internally or by aggregating data from various sources) which greatly contributes to the value of this post-trade transparency to institutional investors.

6. Issues for Industry Participants

In light of the above observations, before regulated bond price transparency is pursued, the following issues should be considered by the bond industry and its regulators.

6.1 Why Regulate?

- Are regulatory initiatives to increase price transparency based on the failure of market participants to develop needed price transparency in some or all sectors of the European bond market?
- Are regulatory initiatives to reduce the risk of market abuse or market manipulation being committed and does this risk result from insufficient price transparency?
- Are regulatory initiatives instead to reduce the risks of misconduct by certain issuers that have, through the misuse of complex financial structures, involving special purpose entities, caused losses to bond investors?
- Or are regulatory initiatives to allow the investor community, and in particular retail investors, to make better informed trading decisions?
- Can all or some of these issues only be addressed through regulatory intervention? Is a new regulated price transparency regime necessary or would certain of these issues be better addressed through the strengthening of existing regulatory frameworks relating, for example, to issuer financial disclosure, corporate governance, accounting practices, best execution and/or market abuse?
- What has been the market response to date? Should market participants be allowed to continue to drive the evolution of what data is available, to whom, how quickly and at what cost?

6.2 What Bond Sectors?

- Is additional pre- and post-trade price transparency feasible over and above what is currently provided

in the most actively traded bonds (i.e. Government and high-grade bonds)?

- For most bonds, including many sovereign issues, trading is fairly active for a short period of time after bonds are first issued. After that, trading falls off sharply, and the vast majority of outstanding bonds trade very infrequently.¹⁴ What are the relevance and impact of requiring increased price transparency in a product that trades infrequently?
- Will forcing more dealers to provide and publish firm quotes lead to distorted or artificial liquidity in already liquid markets? In less liquid or structured markets, will excessive price transparency discourage market making and actually prevent the further development of liquidity?
- Do investors need pre- and post-trade price transparency in all bonds (along the lines of the U.S. model) or only in the most actively traded bonds, in which retail investors are most likely to invest (along the lines of the Canadian model)?

6.3 Which Investors?

- In most liquid bond markets ranging from Governments to emerging markets, price information both for execution and valuation purposes is readily available for all institutional investors that are sufficiently large to have a relationship with several dealers. Do institutional investors receive sufficient price transparency? Are dealers, platforms and vendors showing initiative to continue to provide increased price transparency?
- What level of price transparency is useful to retail investors? Is it pre-trade quotes or actual prices? Is it trade prices of institutional blocks or retail size blocks? Is it trade prices on every product or the most frequently traded ones?
- What are the actual needs of retail investors? Retail investors generally invest in bonds for long term investment (i.e. they buy and hold). In selecting an investment, would the retail investor benefit more from real-time price information or from an ability to compare yields in all markets to determine the investment yield (and price) that meets their risk profile in terms of currency, maturity, interest rate and credit quality?
- In other words, what is the best way to educate retail investors to the risks and benefits of investing in bonds and to ensure that when retail investors make an investment, they benefit from appropriate best execution practices and are protected by a suitability regime?
- Should market participants, namely the dealers, platforms and vendors, voluntarily sponsor an initiative that makes relevant price information available free of charge and in a form suitable for retail investors? Should regulators mandate such a system, at the expense of either taxpayers or market participants?
- Which data can be made available free of charge to the retail investor community, without impacting the business model that currently exists around the pre- and post-trade prices provided to institutional customers by dealers, platforms and vendors?

6.4 Conclusion

- The European bond markets are experiencing growth, innovation and transformation, causing trading platforms and data vendors continuously to increase their market coverage as well as the quality and transparency of their services.
- Market participants will need to work closely with the regulators to ensure that there is continuous progress in addressing the appropriate level of institutional price transparency across the respective

¹⁴ In the U.S., according to the NASD, only 5 percent of the 29,000 U.S. TRACE-eligible trade 5 or more times a day. In Europe, according to ISMA, on a recent day chosen at random, no trades were reported to TRAX for 85 percent of the 40,000 bonds outstanding in Europe. Of the 15 percent where at least one trade was reported, less than half traded more than twice.

bond market sectors.

- The market and its regulators should establish a framework for providing bond market education and price and yield transparency for the European retail investor community. As bond investments become increasingly important for retail investors both directly and indirectly via their pension fund providers and other savings products, these efforts should take priority.
- Developing answers to the questions noted above will help ensure that any policy on price transparency is properly formulated and that the European bond markets continue to grow.

Annex A: Research Methodology

This study was conducted from November 2004 through March 2005.

The following sources were used:

1. TBMA's annual *eCommerce in the Fixed-Income Markets: The 2004 Review of Electronic Transaction Systems*, released in December 2004.
2. Publicly available information on vendors and platforms and their pricing sources and services, primarily from Web sites.
3. Consultant reports and other analytical research on the pricing source market.
4. Interviews with price data information vendors, banks and platforms.

The issues addressed in the interviews were:

- Whether pre-trade quotes, two-way quotes or one-way (bid or offer) quotes are provided.
- Pre-trade pricing type: matrix, indicative or executable prices.
- Exceptions to availability of pre-trade information based on, for example, trade size and liquidity of the issue.
- Source of prices: who/how many provide prices and/or trades on the platform.
- Whether post-trade prices are available.
- Who has access to the pricing information.
- Whether the pricing is available to/seen by all market participants all the time, or only to some participants—based on request.
- Whether pricing data is only available in real time, on a delayed basis (length of delay) or at end of day.
- Whether pricing data is only available from trades on the platform or from other sources, including voice.
- Distribution/sale of pricing data to other networks and timing of such information.
- Bond sectors covered and number of issues for which pricing is provided.
- Other details on bonds—ISIN, coupon, duration, yields, terms and conditions, analytics.
- Charge for pricing data? If so, how much?

The following market constituencies were interviewed.

Dealers/Banks

- Representative sample, including private banking area

Platforms

- eSpeed, Inc.
- Eurex Bonds
- ICAP Electronic Broking (BrokerTec and ETC)
- MTS Group
- Bloomberg (BondTrader and ALLQ)
- Bondscape
- BondVision
- MarketAxess Holdings Inc.

- Reuters Fixed Income Trading
- SWX Swiss Exchange
- TLX SpA
- TradeWeb

Pricing Data Vendors

- Bloomberg
- FT Interactive Data
- International Index Company (iBoxx)
- Markit
- Reuters
- Telerate
- Thomson Financial

The Bond Market Association gratefully acknowledges and appreciates the assistance of these organisations in the preparation of this study.

Annex B: Electronic Trading Platform Profiles¹⁵

eSpeed, Inc.

www.espeed.com

Type of system: Multi-dealer to dealer.

Trading method: Cross-matching.

Trading platform participants: Dealers.

European sector coverage: Government bonds, investment-grade and high-yield corporate. Agency and supranational and other sectors also covered.

Minimum trading size: \$1 million increments.

Average daily turnover: Not available.

Price contributor: Dealers.

Pre-trade pricing: Executable.

Post-trade prices: Real time.

Pricing data cost: Free to qualifying members.

Sale of pricing data (non-participants, non-vendors): Disseminated by Cantor Market Data, a division of Cantor Fitzgerald.

Cost of pricing data (non-participants, non-vendors): Not available.

Pricing data distributed by vendors: Disseminated by Cantor Market Data, a division of Cantor Fitzgerald, through third-party vendors such as Bloomberg, Reuters, CQG, Thomson and Infotec.

Non-price information: Core bond description information available.

Eurex Bonds

www.eurex-bonds.com

Type of system: Multi-dealer to dealer.

Trading method: Cross-matching.

Trading platform participants: Dealers.

European sector coverage: German government, investment-grade corporate, agency, supranational bonds, jumbo mortgage bonds and basis trading in German government bonds.

Minimum trading size: €1 million for all bonds and €5 million for all basis instruments.

Average daily turnover: €486 million German government bonds in 2004.

Price contributors: 31 dealers, including 18 market makers.

Pre-trade prices: Executable.

Post-trade prices: Real time.

Pricing data cost: Free to participants.

Sale of pricing data (non-participants, non-vendors): Pricing data disseminated by Market Data & Analytics, a division of Deutsche Börse Group.

Cost of pricing data (non-participants, non-vendors): Not available.

Pricing data distributed by vendors: Real-time price dissemination via Deutsche Börse

¹⁵The brief descriptions in this Annex of trading platforms are deemed to be correct as of March 2005 based on publicly available information and interviews, and thus the level of detail may differ among descriptions.

broadcast feed to vendors, including Bloomberg, Reuters and Telekurs.

Non-price information: Core bond information, including volume, prices, coupon, yield, high and low, and price change from previous trades.

ICAP Electronic Broking (BrokerTec and ETC)

www.icap.com

Type of system: Multi-dealer to dealer.

Trading method: Cross-matching and voice.

Trading platform participants: Dealers.

European sector coverage: Approximately 500 to 600 listed European government bonds. Agency, supranational, investment-grade, repo and other markets also offered.

Minimum trading size: €1 million.

Average daily turnover: Over \$450 billion in 2005, including all markets.

Price contributors: 68 dealers.

Pre-trade prices: Executable.

Post-trade prices: Real time.

Pricing data cost: Free to participants.

Sale of pricing data (non-participants, non-vendors): No (except U.S. Treasuries).

Cost of pricing data (non-participants, non-vendors): Not applicable.

Pricing data distributed by vendors: U.S. Treasuries available through Telerate.

Non-price information: Core bond description information, including volume, historical prices coupon, and yield.

MTS Group

www.mtsgroup.org

Type of system: Multi-dealer to dealer electronic trading platform group, including EuroMTS, EuroCreditMTS, NewEuroMTS, MTS Quasi-Government Market, EuroBenchmark Treasury Bills Market, EuroMTS Linkers Market, MTS Cedulas Market, MTS Amsterdam, MTS Austrian Market, MTS Belgium, MTS Denmark, MTS Deutschland, MTS España, MTS Finland, MTS France, MTS Greek Market, MTS Ireland, MTS Italy, MTS Poland, MTS Portugal and BondVision.

Trading method: Firm quotes for cash market. Cross-matching for repo and basis instruments.

Trading platform participants: Dealers.

European sector coverage: European government securities (cash, repo and basis) in euro and local currency. Individual MTS platforms may cover agencies, supranationals, covered bonds and other sectors. Approximately 650 bonds.

Minimum trading size: Varies as to MTS market and type of instrument.

Average daily turnover: €85 billion—€25 billion cash markets and €60 billion repo.

Price contributors: 350 market makers.

Pre-trade prices: Executable.

Post-trade prices: Real time to participants. Free at the end of the day on Web site of individual MTS platforms.

Pricing data cost: Free to participants. Free at end of day to general public.

Sale of pricing data (non-participants, non-vendors): No.

Cost of pricing data (non-participants, non-vendors): Not applicable.

Pricing data distributed by vendors: Real-time pricing information available via data vendors, including, among others: Bloomberg, Reuters, Telekurs, Telerate and Thomson Financial.

Non-price information: Core bond description information, including volume, prices, coupon, yield and ISIN.

Bloomberg BondTrader

www.bloomberg.com

Type of system: Multi-dealer to customer.

Trading method: Firm quotes and request for quotes.

Trading platform participants: Dealer and institutional buy-side.

European sector coverage: Government bonds, agency and supranational.

Minimum trading size: Not available.

Average daily turnover: €5 billion.

Price Contributors: 94 dealers.

Pre-trade prices: Executable and indicative, depending on trading methodology and subject to consent by price contributor.

Post-trade prices: Real time, available to dealers only.

Pricing data cost: Free to participants (subject to consent).

Sale of pricing data (non-participants, non-vendors): Direct feeds to dealers and institutional investors.

Cost of pricing data (non-participants, non-vendors): According to Data License fee structure and based on amount of data required.

Pricing data distributed by vendors: No.

Non-price information: Descriptive information available through the DES Bloomberg function, including size, rating, coupon, yield, issuer, maturity and any other core bond description information.

Bloomberg ALLQ¹⁶

www.bloomberg.com

Type of system: Multi-dealer to customer.

Trading method: Firm quotes and request for quotes.

Trading platform participants: Dealer and institutional buy-side.

European sector coverage: Most sectors, including government, investment-grade and high-yield corporate, agency, supranational and emerging markets.

Minimum trading size: Not available.

Average daily turnover: Not available.

Price Contributors: 94 dealers.

Pre-trade prices: Executable and indicative, depending on trading methodology and subject to consent by price contributor.

Post-trade prices: Real time, available to dealers only.

Pricing data cost: Not available.

Sale of pricing data (non-participants, non-vendors): Not available.

¹⁶In addition and separate from BondTrader, Bloomberg makes available its ALLQ (all quotes) function from which price quotes provided by dealer contributors can be viewed. Depending on the price contributor, the quotes may be firm or indicative. If firm, the quote can be hit as long as it is seen on the screen. The ALLQ function is available for the broad array of market sectors, including investment grade, high-yield and emerging market.

Cost of pricing data (non-participants, non-vendors): Not available.

Pricing data distributed by vendors: No.

Non-price information: Yes.

Bondscape

www.bondscape.net

Type of system: Multi-dealer to customer.

Trading method: Firm quotes.

Trading platform participants: Professional investment advisors.

European sector coverage: Government bonds, investment-grade corporate and agency securities.

Approximately 350 bonds.

Minimum trading size: No. Limits are on maximum sizes of 250,000 nominal for core instruments and 100,000 for all other instruments.

Average daily turnover: Not available.

Price contributors: 3 market makers.

Pre-trade prices: Executable.

Post-trade prices: Closing price information available at the end of day on Web site.

Pricing data cost: Free to participants.

Sale of pricing data (non-participants, non-vendors): No.

Cost of pricing data (non-participants, non-vendors): Not applicable.

Pricing data distributed by vendors: No.

Non-price information: Core bond information includes prices, coupon, yield and maturity.

BondVision

www.bondvision.net

Type of system: Multi-dealer to customer. Part of the MTS Group.

Trading method: Request for quotes from up to 4 dealers at a time.

Trading platform participants: Dealers and institutional buy-side.

European sector coverage: Government bonds, investment-grade corporate, agency, supranational securities, among other markets. Approximately 900 bonds.

Minimum trading size: 100,000 for government bonds and 1,000 for non-government bonds, regardless of currency.

Average daily turnover: €3 billion.

Price contributors: 33 dealers.

Pre-trade prices: Last traded prices are available on “Best Page” summary.

Post-trade prices: Available real-time on “Best Page”.

Pricing data cost: Free to participants.

Sale of pricing data (non-participants, non-vendors): No.

Cost of pricing data (non-participants, non-vendors): Not applicable.

Pricing data distributed by vendors: No.

Non-price information: Core bond information includes prices, coupon, yield and maturity.

MarketAxess Holdings Inc.

www.marketaxess.com

Type of system: Multi-dealer to customer.

Trading method: Request for quotes.

Trading platform participants: Dealers and institutional investor firms.

European sector coverage: Investment-grade corporate, agency, structured products and supranational bonds.

Minimum trading size: Not available.

Average daily turnover: \$306 million of European investment-grade, \$734 million of U.S. investment-grade, and \$152 million of other bonds.

Price contributor: 22 participating broker-dealer clients.

Pre-trade pricing: Indicative commingled inventory prices. Prices returned from inquiries are executable for a defined period of time.

Post-trade prices: Real time.

Pricing data cost: Provided at no cost to participating members.

Sale of pricing data (non-participants, non-vendors): No.

Cost of pricing data (non-participants, non-vendors): Not applicable.

Pricing data distributed by vendors: No.

Non-price information: Bond information, including spreads, news and research reports, custom data reports, liquidity ratios and other analytical tools.

Reuters Fixed Income Trading

www.reuters.com

Type of system: Multi-dealer to customer.¹⁷

Trading method: Firm quotes and request for quotes.

Trading platform participants: Dealers and institutional buy-side.

European sector coverage: Most sectors, including government, investment-grade and high-yield corporate, agency, supranational and emerging markets. Overall, more than 12,500 fixed-income securities available across 21 currencies in 27 countries.

Minimum trading size: No.

Average daily turnover: Not available.

Price contributor: 6 dealers with 9 additional to join later in 2005.

Pre-trade pricing: Executable and indicative.

Post-trade prices: Real time.

Pricing data cost: part of Reuters 3000 XTRA at no additional cost.

Sale of pricing data (non-participants, non-vendors): Not available.

Cost of pricing data (non-participants, non-vendors): Not available.

Pricing data distributed by vendors: No.

Non-price information: Terms, conditions & reference data, news, analysis, charts and history data.

¹⁷ Reuters also includes “single dealer to customer” in its description of Type of System.

SWX Swiss Exchange

www.swx.com

Type of system: Multi-dealer to customer exchange.

Trading method: Cross-matching.

Trading platform participants: Institutional dealers and institutional buy-side.

European sector coverage: Most sectors, including government, investment-grade and high-yield corporate, agency, supranational and emerging markets. Overall, more than 3,600 fixed-income securities available.

Minimum trading size: Smallest tradable unit.

Average daily turnover: CHF 1 billion in 2004, including Swiss and foreign bonds.

Price contributors: 7 market makers.

Pre-trade pricing: Executable.

Post-trade prices: Real time for dealers and buy side. Delayed 30 minutes on Web site.

Pricing data cost: Free to participating members. Free on Web site after 30 minutes.

Sale of pricing data (non-participants, non-vendors): Available to dealer and institutional buy-side.

Transmission of market information is calculated on the basis of the actual number of users who have access to the market information (user-based fee).

Cost of pricing data (non-participants, non-vendors): Transmission of market information is calculated on the basis of the actual number of users who have access to the market information (user-based fee).

Pricing data distributed by vendors: Real-time information disseminated by major data vendors, such as Bloomberg, Reuters and Telekurs.

Non-price information: Core bond description information, including volume, coupon, accrued interest and high/low price for a specific period.

TLX SpA

www.eurotlx.com

Type of system: Multi-dealer to customer.

Trading method: Cross-matching.

Trading platform participants: Dealers and institutional buy-side.

European sector coverage: Most sectors, including government (approximately 250 bonds), investment-grade and high-yield corporate (approximately 150 bonds), agency, supranational (approximately 100 bonds) and emerging markets.

Minimum trading size: No minimum size. 1,000 bonds minimum quantity.

Average daily turnover: €55 million.

Price contributor: 40 dealers and 1 market maker.

Pre-trade pricing: Executable.

Post-trade prices: Real time on Web site.

Pricing data cost: Free on Web site.

Sale of pricing data (non-participants, non-vendors): No.

Cost of pricing data (non-participants, non-vendors): Not applicable.

Pricing data distributed by vendors: Pricing information available on third-party data providers in real time, such as Reuters, Telekurs, and InfoVendor, and local providers like Sole24Ore and MFSat.

Non-price information: Term sheet containing basic bond description information, including ISIN, coupon, issuer, maturity and rating.

TradeWeb

www.tradeweb.com

Type of system: Multi-dealer to customer.

Trading method: Request for quotes.

Trading platform participants: Dealers and institutional buy-side.

European sector coverage: Over 350 European government bonds, including most liquid issuers from all of the Euro-zone countries, Denmark, Sweden and the UK. Euro T-Bills, agency and supranational also available.

Minimum trading size: Minimum lot size.

Average daily turnover: Over €8 billion.

Price contributor: 26 dealers who are market makers in all or subset of the bonds traded on TradeWeb.

Pre-trade pricing: Indicative. Quotes received from inquiries are executable.

Post-trade prices: Delayed 15 minutes.

Pricing data cost: Free to existing customers.

Sale of pricing data (non-participants, non-vendors): Export of pricing data are available to dealers and buy-side.

Cost of pricing data (non-participants, non-vendors): Per-product basis.

Pricing data distributed by vendors: Distributed by Telerate and Reuters.

Non-price information: Basic bond information, including coupon, yield, ISIN and other core bond characteristics.

Annex C: Market Data Vendor Profiles¹⁸

Bloomberg

<http://www.bloomberg.com>

Summary: Ubiquitous and leading source of market and price information, primarily as a redistributing network, making available price information from other sources including dealers.

Access: All; denial by dealer of access to its dealer page only exception (generally only the case with competing dealers) but no limitation on Bloomberg-generated prices and other data.

Approximate Fee to End-User Customer: about €15,000 annually per terminal, additional charges imposed by some information sources distributed through Bloomberg.

Analytical Non-Price Information: Yes; a broad set of research and analytical tools.

Source/Provider of Price Data: (1) dealer quotes (2) consolidated prices (3) exchanges (4) iBoxx (5) ISMA (Price Service) (6) platforms (MTS, Eurex trading platforms) (7) Bloomberg-evaluated prices; 8,100 information sources used, including 329 dealers and 397 third-party feeds globally for terms and conditions, news and research and price information, inclusive of all markets; 94 European dealer price contributors for pre-trade quotes (see Pre-trade).

Data Update Frequency (numbering follows “Source/Provider Price Data”): (1) dependent on dealer, generally posted without additional delay (2) intraday (3) real time or minimal delay (4) see iBoxx (5) see ISMA (6) real time or minimal delay (7) when prices on comparable bonds change.

Pre-trade (number of contributors in parentheses): Dealer prices and Bloomberg-consolidated prices (94); IIC (9) ISMA (40).

Post-Trade: ISMA-TRAX; MTS, Eurex trading platforms; and exchanges.

Vendor Market Coverage (number of issues with prices in Europe): Government (6,500), corporate (48,000), emerging market (1,914) and ABS (not available). 4.8 million bonds priced globally.

Price Methodology: Three levels of service: (1) prices on the individual dealer pages (indicative or executable dependent on the dealer) (2) consolidated based on average price-minimum of 3 contributors (3) bond evaluation service based on peers, middle of the credit curve and yield curves; other information sources distributed through Bloomberg determined by the source (for example, see IIC, ISMA).

Distribution through other vendors: None, accessible to end users only.

FT Interactive Data

<http://www.ftinteractivedata.com>

Summary: Major operating subsidiary of Interactive Data Corporation. Leading provider of financial information and analytical software to global markets. Global securities pricing, evaluations, dividend, corporate action and descriptive information for more than 3.5 million securities. Daily evaluations for approximately 2.5 million fixed-income and international equity issues. “Hard-to-value” unlisted fixed-income instruments and “hard-to-get” information from emerging markets.

Access: All; service subscriptions open to anyone.

Approximate Fee to End-User Customer: Fees vary based on such variables as services, usage, method of delivery and delivery frequency.

Analytical Non-Price Information: FT Interactive Data provides terms and conditions, corporate actions and historical data for fixed-income instruments.

Source/Provider of Price Data: Evaluated pricing via FT Interactive Data’s proprietary models and

¹⁸ The brief descriptions in this Annex of market data vendors are deemed to be correct as of March 2005 based on publicly available information and interviews, and thus the level of detail may differ among descriptions. Telekurs and ISMA were not interviewed.

methodologies.

Data Update Frequency: Daily descriptive data updates and end-of-day fixed-income evaluations (local close).

Pre-trade (number of contributors in parentheses): N/A¹⁹

Post-trade: N/A.²⁰

Vendor Market Coverage (number of issues with prices in Europe): Government (1,035), non-government (11,053), high yield (1,016), emerging market (900) and ABS (1,055).

Price methodology: FT Interactive Data's bond-evaluation methodology is based on in-house modeling techniques combined with a professional evaluation staff who fine-tune individual evaluations.

Methodology sheets available on FT Interactive Data's Web site at www.ftinteractivedata.com/products/data_type/evaluated/bond_evaluation.shtml.

Distribution: Direct to clients or via third-party vendors/redistributors.

iBoxx or International Index Company (IIC)

<http://www.indexco.com/>

Summary: An important and trusted source of publicly available price information for the investment-grade portion of the market and benchmark indices through iBoxx indices for the cash market and DJ iTraxx;²¹ prices available on individual bonds that comprise the indices.

Access: All; no limitation.

Approximate Fee to End-User Customer: Free/€1,500 per customer annually (Full Transmission Processing or FTP download); available free of charge to the public on its Web site on an end-of-the day basis by registering on indexco.com; two additional delivery options available on a fee license basis, live feed prices (via data vendors) and delivered through a direct data feed on an end-of-day basis; higher fee to data distribution networks, including annual direct-feed license fee.

Analytical Non-Price Information: Yes; static, basic bond pricing and analytical bond data included in the bond price report, with graphing and download options; content on individual bonds in addition to historical pricing: rating, currency, issue and maturity date, outstanding amount, expected remaining life, iBoxx indices to which the bond belongs, bond statistics such as yield, duration and convexity and graphing; researching the development of bond liquidity measures.

Source/Provider of Price Data: IIC consolidated prices.

Data Update Frequency: Once a minute; three delivery services: end of day, midday and live feed.

Pre-trade (number of contributors in parentheses): Consolidated (9).

Post-trade prices: No.

Vendor Market Coverage (number of issues with prices in Europe):

EUR: government (465), corporate (725), ABS (20).

GBP: government (194), corporate (603), ABS (8)-GBP.

In addition, 56 MBS and 76 other credit-enhanced (e.g., insurance) bonds.

Price methodology: Two-way pre-trade indicative prices: receives bank price quotes, and those quotes subject to an internal quality-control process, including individual and comparative checks; outliers are discarded, prices are consolidated and then disseminated; participating banks committed to providing prices to the universe of bonds that are constituents of the indices. The price quote consolidation process through

¹⁹ N/A, because FT Interactive Data offers an evaluated price service.

²⁰ FT Interactive Data, through its strategic partnership with MarketAxess, provides access to data from the MarketAxess trading platform to U.S.-based clients.

²¹ The DJ iTraxx European and Asian credit derivative product is the result of a merger with the Dow Jones TRAC-X index family in April 2004, resulting in the International Index Company.

Deutsche Börse according to the following rules: If two or three prices make it through the quality controls, the average is reported; if more than three, then the high and low are eliminated; and no reported price if only one price quote reported.

Distribution through other networks: Broadly available through such leading distribution channels as Thomson Datastream, Reuters and Bloomberg; service same as available directly to end-user customers subject to the software programming by the data distribution vendor. Note: Intraday pricing is available only via data vendors.

ISMA Pricing (Pre-trade bid/offer quotes and post-trade based on ISMA-TRAX)

<http://www.isma.co.uk>

Summary: The International Securities Market Association (ISMA) is recognised since 1998 as an institution “similar to an exchange” in Switzerland under the Swiss Federal Stock Exchange Act (SESTA), and subject to supervision by the Swiss Federal Banking Commission (SFBC). In the UK, ISMA is approved as an International Securities Self-Regulating Organisation (ISSRO) under the Financial Services Act of 1986 and retained this status under the Financial Services and Markets Act, 2000.

The ISMA Price Service comprises two price-related services: pre-trade indicative price quotes through the ISMA Council of Reporting Dealers (CRD) and post-trade prices through the TRAX trade-matching and regulatory-reporting service into which market participants are required to report. The service has over 17 years of price history.

Access: All; subscribers collect ISMA data directly via data feeds or an Internet service (www.isma.info). Alternatively, ISMA data available through several data vendors.

Approximate Fee to End-User Customer: Fee dependent on the level of service and other variables/considerations.

Analytical Non-Price Information: Prospectus documentation included in isma.info in electronic format in addition to reference data and pricing. ISMA’s CUPID service focuses on reference data, delivering a universe of up to 100,000 live securities with up to 200 fields of information per security, including fields such as ratings, call provisions, coupon date, yields, ratings, issue amount and date, maturity date and lead manager. Monthly volume statistics part of the ISMA Enhanced Price Service. The volume service contains the average daily turnover volume per security for the preceding month derived from trades entered into TRAX. ISMA’s own bond indices via isma.info. The ISMA/Fortis Bank indices (and matrix price by rating and industry sector in euro-, U.S. dollar- and sterling-denominated securities) delivered via the ISMA Web site, www.isma.org, based on ISMA end-of-day prices, price histories, terms and conditions.

Price contributors/sources: Bid and offer quotes supplied by members of ISMA’s CRD. A full list of CRD members can be found on ISMA’s Web site at www.isma.org. TRAX, ISMA’s post-trade matching and regulatory reporting system currently used by around 200 market participants to confirm trades conducted in the over-the-counter market for international securities. On average, over 2.5 million trade entries made into TRAX each month.

Frequency of Update: Consolidated prices derived from ISMA’s reporting dealer quotes delivered at end of day. TRAX, being a real-time reporting and matching service, collects transaction information during the course of day and the data then reported to subscribers at end of day.

Pre-trade (number of contributors in parentheses): CRD member market-maker firms (40) contribute their end-of-day bid and offer quotes to ISMA.

Post-trade: ISMA-traded prices derived from TRAX, ISMA’s real-time matching and transaction-reporting mechanism.

Vendor Market Coverage (number of issues with prices in Europe): Government (estimated to be between 20

and 30 percent of the total, or between 2,200 and 3,300 including emerging market), corporate (estimated to be between 70 and 80 percent of total, or approximately between 7,700 and 8,800 including emerging market), ABS (small number of issues), emerging market (incorporated in government, corporate totals). Approximately 11,000 international securities priced each business day.

Pricing Methodology: A two-step process is involved in arriving at pre-trade prices: CRD members obliged to report bid and offer quotes to ISMA at end of day; data then scrubbed and a consolidated average bid and offer price calculated. Post trade: the high, low and average prices of securities calculated from trades entered that day onto TRAX. A security will appear on the price feed when there is either a valid quotation or a traded price for that day.

Distribution: ISMA data distributed directly by ISMA via its data feeds and its online service, isma.info, or are alternatively available through major data vendors.

Reuters

<http://www.reuters.com>

Summary: Leading distributor and aggregator of fixed-income prices and content. Reuters DataScope provides content for the distributed products including the Reuters 3000 desktop, through which Reuters Trading For Fixed Income platform is accessible. Reuters evaluated pricing service available in April 2005 in Europe.

Note: Reuters announced discussion with Telerate on a potential merger, subject to due diligence and regulatory approval.

Access: All subscribers, no limitation; dealers may limit access to dealer page.

Approximate Fee to End-User Customer Fee: €12,000 per terminal annual range (for Reuters 3000).

Analytical Non-Price Information: Yes; Reuters content and analytics include terms and conditions, corporate actions, analytics including spreads over the benchmark sovereign, and swap curve, credit rating, maturity, yields, convexity and duration. Reuters price evaluation service (EJV) bundled into the products, which includes bond evaluations and historical pricing.

Source/Provider of Price Data: (1) dealer quotes; (2) consolidated prices (3) exchanges (4) IIC (5) ISMA-TRAX (6) platforms (Eurex, TLX Euro, EuroMTS, ICAP BrokerTec) (7) Reuters (EJV) evaluated prices.

Data Update Frequency (numbering follows that of "Source/Provider of Price Data"): (1) dealer page-dependent on dealer, no delay; (2) intraday (3) no delay (4) see IIC (5) see ISMA (6) real time or minimal delay (7) every 10 minutes for actively traded issues, end-of-day for infrequently traded issues.

Pre-trade (price contributors in parentheses): consolidated prices and dealer prices (35 on liquid issues; Reuters indicates that a total of 250 to 300 banks contribute prices); IIC (9).

Post-trade: ISMA-TRAX, platforms (Eurex, TLX Euro, EuroMTS, ICAP BrokerTec, TradeWeb) and exchanges.

Vendor Market Coverage (number of issues with prices in Europe): Government (3,801), corporate (25,581), emerging market (638), ABS (479); Reuters evaluated prices after April 2005 launch (70,000).

Pricing Methodology: Generally indicative on bank dealer pages, with consolidated price quote based on most recent quote; Reuters executable prices currently through 15 dealers; April 2005 launch of Reuters evaluated (modeled) pricing for investment-grade bonds in U.S. dollars, Swiss francs, French francs and euro; methodology for other pricing sources as determined by the sources that distribute through Reuters.

Distribution: No distribution through other networks; is aggregator.

Telekurs

<http://www.telekurs-financial.com>

Summary: A financial data aggregator and distribution network, offering bond pricing from exchanges, dealers and platforms through its Investdata system; also source for descriptive data, including terms and conditions and corporate actions; evaluated bond price service through relationship with S&P.

Access: All; no limitation.

Approximate Fee to End-User Customer Fee: Information not available; per-bond basis for evaluated service.

Analytical Non-Price Information: Yes; descriptive data, terms and conditions, yields and average life.

Source/Provider of Price Data: (1) dealers, (2) exchanges (3) platforms (Eurex, MTS) (4) Telekurs/S&P evaluated pricing service.

Data Update Frequency: (1) real time (2) real time or minimal delay (3) real time or minimal delay (4) end of day.

Pre-trade (price contributors in parentheses): Dealers (56).

Post-trade: Platforms (Eurex, MTS), exchanges.

Vendor Market Coverage (number of issues with prices in Europe): Government (not available), corporate (not available), emerging market (not available), ABS (not available).

Pricing Method: Evaluated prices through the S&P joint venture for European bonds, using Telekurs Global Pricing System Service (GPS), a terms and conditions and corporate action database, and S&P's valuation methodology (Integrated Evaluation Service) or alternatively on a cash-flow basis when there are no comparable bonds; evaluates about 20,000 securities, primarily in Europe; also distribution of platform, dealer and exchange price data in form provided by sources.

Distribution through other networks: Telekurs data used or distributed by Web sites in Germany, Switzerland, Italy and the Netherlands; market data feeds to 14 countries; bond terms and conditions data incorporated into other vendor products and databases.

Telerate

<http://www.telerate.com>

Summary: Distributor and aggregator of fixed-income prices and content; Telerate announced discussion with Reuters on a potential merger, subject to due diligence and regulatory approval. Desktop product: Web Station.

Access: All, no limitation; dealers may limit access to dealer page.

Approximate Fee to End-User Customer Fee: €3,600-€8,400; basic annual fee of €3,600 to €6,000 per terminal, with up to €8,400, including add-on for trading platform data from TradeWeb, EuroMTS and ICAP BrokerTec.

Analytical Non-Price Information: Yes; Telerate content and analytics include terms and conditions, corporate actions, analytics including spreads over the benchmark sovereign, and swap curve, credit rating, maturity, yields, convexity and duration.

Source/Provider of Price Data: (1) dealer quotes; (2) consolidated prices (3) exchanges (4) IIC (5) ISMA-TRAX (6) platforms (TradeWeb, EuroMTS and ICAP BrokerTec).

Data Update Frequency (numbering follows that of "Source/Provider of Price Data"): (1) dealer page-dependent on dealer, no delay; (2) intraday (3) no delay (4) see iBoxx (5) see ISMA (6) according to platform schedule-real time or minimal delay.

Pre-trade (price contributors in parentheses): Consolidated prices and leading dealer price quotes (unspecified number of dealers); IIC (9).

Post-trade: ISMA-TRAX, platforms (TradeWeb, EuroMTS and ICAP BrokerTec) and exchanges.

Vendor Market Coverage (number of issues with prices in Europe): Government (not available), corporate (not available), emerging market (not available), ABS (not available).

Pricing Methodology: Indicative on bank dealer pages with consolidated price quote based on most recent quotes; methodology for other pricing sources as determined by the sources that distribute through Telerate.

Distribution: No distribution through other networks; is aggregator

Thomson Financial

<http://www.thomson.com/financial/financial.jsp>

Summary: Thomson Financial fixed-income pricing data is available through its Thomson Datastream research product as well as via a direct feed; Thomson Datastream extends beyond bond prices to economics and other market data, including equities, indices and derivatives; Thomson Datastream is generally viewed as a research service, though is used by many functions in the trade process. Apart and independent of Datastream, pricing available from the Thomson-owned TradeWeb (see TradeWeb description in Annex B).

Access: All; no limitation.

Approximate Fee to End-User Customer Fee: Based on number of users for the terminal product and on a per-bond basis for direct feed.

Analytical Non-Price Information: Yes; Thomson Datastream analytics and economic data, bond terms and conditions, calls and redemptions, spreads and implied volatility.

Source/Provider of Price Data: (1) dealers, (2) exchanges, (3) IIC, (4) ISMA, (5) TradeWeb - independent of Datastream (6) FT Interactive-evaluated prices.

Data Update Frequency: (1) end of day (2) end of day (3) see IIC (4) see ISMA (5) real time (6) end of day. Note: data to customers end of day from Datastream, more frequently through direct feed.

Pre-trade (price contributors in parentheses): Dealers (7), iBoxx (9), ISMA (40) TradeWeb (26) - independent of Datastream (see Annex B).

Post-trade: ISMA-TRAX, exchange, TradeWeb (independent of Datastream; see Annex B).

Vendor Market Coverage (number of issues with prices in Europe): Government (15,750), corporate (44,000), emerging market (250); both Eurobonds and domestic bonds from selected countries.

Pricing Methodology: Indicative pricing quotes (unconsolidated) from dealers exchange prices with method depending on provider, evaluated, last trade, average, or exchange traded price; TradeWeb (see TradeWeb description in Annex B); carries IIC and ISMA consolidated prices (see IIC, ISMA).

Distribution: No distribution through other networks.

Specialty and Regional Pricing Source Information Vendors

SIA (Società Interbancaria per l'Automazione)

<http://www.sia.it>

SIA is a leading Italian provider of technological services and solutions for the banking and financial community. Founded by the Bank of Italy, ABI (the Italian Banking Association) and some private banks, SIA has designed, implemented and managed projects for financial systems system automation, including: the Italian Interbanking Network (RNI) and the technological architecture of financial markets such as Borsa Italiana, e-MID and MTS.

Its MDBx Real Time Finance product provides information on Italian and foreign financial markets. The information on indices, stocks, bonds, futures, options and funds, together with economic and financial news, is delivered via satellite or cable in real or delayed time. As a stand-alone, the MDBx service receives and stores the data on a single dedicated workstation.

In the client/server mode, the data is stored on the server rather than on the customer's workstation. The server, known as the Info Server, receives the data and then distributes it to the connected Info Clients in real

or delayed time.

The MDBx product provides a set of functional tools for customizing and allowing easy search capabilities and data retrieval. The customization functions make it possible to:

- create, modify and manage tailored lists of securities from different markets that can be displayed in user-defined formats.
- create, modify and manage virtual portfolios for simulating trading in Italian or foreign stock and bonds.
- create, modify and manage monitor displays spread over a number of pages and made up of different windows selected by the user.
- create windows with customized calculation formulas.
- create and modify lists of bonds, setting specific threshold limits.

It also enables

- Display of tailored list of securities.
- Bond search by description, ISIN or alpha numeric.
- Graphing on bond prices and indices.
- Bond reports, including news feeds.
- Real-time indicative quotes.
- High and low prices during the day and year.

Fininfo

<http://www.fininfo.fr>

Fininfo provides information on French Government, public sector and corporate securities free of charge on its Web site. Their terms and conditions for the French domestic issues are used by larger data providers and sources. It has also served as distribution channel for other data vendors in France and has offered a pricing service based on prices supplied by dealer contributors.

Markit

<http://www.markit.com>

London-based Markit Group Inc. was formed in 2001 as an independent provider of pricing data across multiple asset classes. In the cash market, Markit has an extensive database of high-quality daily mark-to-market prices from over 40 contributor banks covering over 12,000 redistributable asset-swapped instruments from a universe of 25,000 cash securities. In the credit market, the company provides CDS composite and contributor-level data on over 12,500 individual CDS term structures representing 2,600 individual entities. Markit receives its data from the books of records of over 46 contributor institutions and now has over 250 institutional clients. Markit also offers a variety of tools and services such as a PV calculator, dividend forecasting and monthly valuations to help customers manage their risk.

Annex D: Summary of MiFID Price Transparency Provisions

- The EU Directive on Markets in Financial Instruments (MiFID)²² was published on 30 April 2004. The directive states that Member States have until 30 April 2006 to bring its provisions into force. However,

the European Commission is considering proposals to delay this deadline to 30 April 2007.

- MiFID includes provisions designed to ensure a greater degree of pre- and post-trade transparency for transactions in shares admitted to trading on an EU-regulated market (broadly speaking, EU-listed shares).
- However, these provisions are also of concern to the bond (and other fixed-income) market:
 1. MiFID specifically contemplates that Member States may choose to apply these provisions to transactions in financial instruments other than shares, such as bonds.²³ It is understood that Member States such as Denmark and Italy have been considering this option.
 2. In addition, the European Commission is required to present a report, by 1 May 2006, to the European Parliament and the Council of Ministers on the possible extension of these provisions to transactions in classes of instruments other than shares.²⁴ MiFID contemplates that, before issuing this report, the European Commission will engage in discussions with national regulators and will carry out a public consultation, the preparatory work on which is likely to get under way in 2005. If the implementation deadline is moved back to 2007, it is likely that the deadline for this report will move too; the European Commission will have more time within which to complete its preparatory work.
- As regards pre-trade transparency for listed shares, MiFID provides as follows:
 1. EU-regulated markets and multilateral trading facilities (MTFs)²⁵ will disclose current bids/offers and depth of trading interest on a continuous basis during normal trading hours, subject to some exceptions designed to allow, for example, crossing systems to operate.²⁶
 2. Investment firms that are so-called “systematic internalisers” in shares will publish firm bids/offers for those shares on a continuous basis during normal trading hours and must be prepared to deal against those prices.²⁷ The definition of “systematic internaliser” covers firms which, on an organised, frequent and systematic basis, deal on own account by executing client orders outside a regulated market or MTF,²⁸ although the precise ambit of this remains unclear.
- As regards post-trade transparency for listed shares, MiFID provides as follows:
 1. Regulated markets and MTFs will publish, in as close to real time as possible, the following: the price, volume and time of transactions executed in their systems (subject to exceptions allowing deferred publication of transactions which are large in scale for the normal market size for the share in question).²⁹
 2. Investment firms which conclude transactions in shares on own account or for clients outside a regulated market or MTF are required to publish the volume, price and time of those transactions. The information must be made available as close to real time as possible on a reasonable commercial

²² Directive 2004/39/EC.

²³ Recital 46. The recital contemplates that where a Member State applies these provisions to other financial instruments, its rules will apply to firms incorporated in that Member State and firms from other Member States operating there through branches.

²⁴ Article 65(1).

²⁵ The term used in MiFID for what are sometimes called alternative trading systems.

²⁶ Articles 29 and 44.

²⁷ Article 27

³⁸ Article 4(7)

²⁹ Articles 30 and 45

basis, using the facilities of a regulated market or third party or proprietary arrangements. There can be exceptions allowing deferred reporting similar to those that apply to regulated markets and MTFs.³⁰

- MiFID does not fully specify how these requirements will operate and allows the Commission to adopt implementing measures to spell out these requirements in greater detail. The Commission calls for technical advice on these measures from the Committee of European Securities Regulators (CESR), which will normally consult the public before sending its formal advice on any implementing measures to the Commission. CESR is consulting on aspects of these requirements at present.

³⁰ Article 28.

Annex E: Case Studies

1. The North American Experience

Canada³¹

CanPX is an industry-led initiative that was formed in the late 1990s by market participants in order to enhance price transparency in the fixed-income markets in Canada. Bond dealer and inter-dealer brokers (“IDB”) are the shareholders and participants in the CanPX system. Initially, the system consolidated the IDB feeds and displayed the best bid-offer price and yield quotations and traded prices on a real-time basis for actively traded Government bonds. In 2001, the CanPX system was expanded to include a broader range of federal and provincial bonds and traded prices on 20 actively traded bonds.

While the corporate market in Canada remains relatively small relative to the Government market, it has grown from 2 percent to 4 percent of traded volume over the last five years. That growth combined with substantial retail participation has led to increased attention to price transparency in the Canadian corporate market.

The Canadian Securities Administrators (“CSA”) established a regulatory framework for transparency in fixed income markets at the end of 2003. The regulations went into effect immediately for the trading of corporate debt securities with CanPX designated as the Information Processor for the initial three years. Transparency regulations for the Government bond market is being delayed for three years. During that period, the CSA will consult further with industry and market participants on an appropriate level of price transparency for the Government market in Canada.

Regulations require that marketplaces, IDBs and dealers trading in corporate debt securities, provide details of trades on designated securities to CanPX for public display. CanPX must display each trade, within one hour of the trade, along with the issue, type, coupon, maturity, price, yield, time of trade and the volume traded subject up to a \$2 million for investment grade and \$200,000 for non-investment grade cap.

All Investment Dealers Association members (a Canadian organization) with at least a 0.5 percent share of corporate bond trading volume for two of the three most recent quarters are required to submit pricing feeds. CanPX currently designates 28 corporate bonds for reporting. The CanPX corporate bond list is updated quarterly in consultation with the industry. The criteria include:

- minimum total issue size (including reopenings) of \$250 million
- relatively liquid
- bonds representing a majority of trade flow within the corporate bond markets
- representation of all major industrial groups of issuers
- representation of all maturity buckets
- broad interest to retail investors, including, for example, bonds issued by well-known corporations, major corporate bond indexes, terms to maturity of less than 5 years, and bonds priced at a discount.

Access to the CanPX Corporates data is available to institutional investors through vendor packages provided by Reuters and Telerate, and to retail investors through a web-based product offered at a subscription price of \$50 per month.

³¹ This section was based on the Canadian Investment Dealers Association (IDA) paper, “Overview of Pre-Trade Transparency in the Canadian Corporate Bond Market” dated February 16, 2005 prepared for presentation at the February 16, 2005 meeting of the International Council of Securities Associations (ICSA) Working Group on Bond Market Transparency.

Several factors will affect the continuation of the CanPX service beyond the initial three year period. They include continuation of its Information Processor designation, retention of the regulatory framework, and the demand for the service which will be dependent on the presence of alternative providers of transparency services in Canada.³²

United States

Government Bonds

The first consolidated system for reporting U.S. bond trade prices was GovPX, which was founded in 1990 by the major U.S. Government bond dealers and inter-dealer brokers in response to concerns expressed by the U.S. Congress, the Securities and Exchange Commission (SEC) and other Governmental authorities that there was inadequate price transparency in the U.S. Treasury market. GovPX was set up to provide real-time trade price and volume information for U.S. Treasuries from the inter-dealer market. The information is made available on the Internet and is distributed by information vendors.

Municipal Bonds

In 1995, the Municipal Securities Rulemaking Board (MSRB) began collecting the details of dealer-to-dealer transactions in the U.S. municipal bond market and distributing daily summary reports of price and volume information about municipal securities that traded at least four times during the day. The threshold was ultimately reduced in 2002 to a minimum two trades during a day. In August 1998, these reports were expanded to include customer trades as well as inter-dealer trades. The MSRB price information is now available on a real time basis.

Corporate Bonds–TRACE

In the United States, over several years, NASD, Inc., a self-regulatory organization, has put in place the Trade Reporting and Compliance Engine (“TRACE”). The NASD rule mandating the reporting of trades in TRACE-eligible securities was first proposed in 1999, and took effect on July 1, 2002. The slow process of roll-out allowed for a smooth implementation. As IOSCO noted in its survey report on price transparency, “The experience in the United States points to the desirability of working closely with the industry in implementing change, focusing initially on the most liquid bonds and, in general, of progressing in stages with a degree of pragmatism.”³³

The TRACE system applies to so-called TRACE-eligible securities. That includes all U.S. dollar denominated book-entry eligible securities, whether investment grade or non-investment grade, and issued by U.S. or foreign private issuers; and either registered under the Securities Act of 1933 or privately placed. It does not include debt issued by government-sponsored entities, mortgage- or asset-backed securities, collateralized mortgage obligations or money market instruments, i.e. securities with a maturity at issuance of a year or less.

At inception, all transactions in TRACE-eligible securities were required to be reported to the NASD within 75 minutes. The time frame was reduced over the course of 27 months to 45 minutes and then to 30 minutes. Effective July 1, 2005, it will be reduced again to 15 minutes.

³² The interest in transparency has led to the development of other sources of pricing information. They include CanDeal and CollectiveBid (“CBID”). CanDeal is an electronic platform developed through a consortium of Canadian securities firms to facilitate dealer to institutional investor trading. The platform follows a Request for Quote system and carries prices for about 25 corporate securities and all federal Government and municipal bonds. CanDeal has broad distribution through TSA Markets, a 40 percent owner of CanDeal, to such data vendors as Thomson, Reuters and Bloomberg. Non-professional (retail) investors may purchase the CanDeal corporate security data at a \$4.00 per month subscription fee and \$1.00 per month with a 15-minute through Stockwatch. CBID displays prices of six participating dealers. It shows the best bid and offered quotes from a consolidated feed on about 1,500 government bonds and 1,000 corporate bonds. CBID provides free of charge on its Web site institutional offer quotes on 15 of the most active corporate bonds.

³³ IOSCO, “Transparency of Corporate Bond Markets” Page 27, May 2004

Dissemination of reported prices to the public was also rolled out in phases. In Phase I, which began in July 2002, all trades in investment grade bonds with an original issuance size of \$1 billion or greater and the high yield bonds in the so-called FIPS 50 were publicly disseminated. Trades of investment grade bonds in an amount larger than \$5 million in face value are disseminated only as 5MM+, and high yield trades of more than \$1 million face value are disseminated as 1 MM+. Under this phase, prices for about 500 bonds were disseminated, representing 50% of the investment grade trading volume.

Phase II went into effect in March 2003. That included dissemination of all transactions in investment grade bonds rated A or above with an issuance size of \$100 million or greater, and a group of 120 selected BBB bonds and 50 high yield bonds. That constituted about 4,400 bonds representing about 65% of the investment grade trading volume.

Phase III went into effect in two stages, beginning October 1, 2004. The first provided for all transactions in publicly offered (i.e. not 144A) TRACE-eligible securities to be publicly disseminated, with certain exceptions. However, in response to continued concerns that liquidity would be harmed by immediate transparency of large transactions in lower rated, illiquid securities, certain bonds were not required to be disseminated between October 1, 2004 and February 7, 2005, and now are disseminated with a delay. The exceptions are for trades greater than \$1 million in securities rated BB and below, which are infrequently traded (meaning they traded less than once a less over a period that was chosen by the NASD), and trades in securities rated BBB and lower during the period immediately following their issuance. The BB and below securities have a delay of 2-4 days; and the securities rated BBB and lower have a delay of 2-10 days following issuance.

When the SEC approved the Phase III proposal, it stated its expectation that, no later than November 1, 2005, the NASD would submit a proposal to eliminate all delays in the dissemination of trade information for TRACE-eligible securities.

Statistics from TRACE show that most TRACE-eligible bonds trade infrequently. According to an NASD report in June 2004, there were 29,000 TRACE-eligible issues. Of those, only 4,700 (16.2 percent) traded at least once each day. Only 5 percent of the eligible issues trade, on average, 5 or more times per day. Less than half (46 percent) of all eligible issues trade at least once each month.

TRACE Not the Only Force Driving U.S Price Transparency

The U.S. market has become much more transparent in recent years. In addition to TRACE price dissemination, market factors have been at work contributing to price transparency and price discovery. As presented earlier in the European context, the emergence of electronic trading platforms has enhanced transparency and access to pricing information to market participants.

The High-Yield Sector: Comments from the Buy-side

As noted in the TRACE history discussion, high-yield price dissemination has moved at a slower pace in consideration of market participant concerns about the effect on liquidity and those holding and managing inventory in less liquid high-yield corporate bonds. Through the TBMA outreach initiatives with the institutional buy-side, investors commented that, in the high-yield sector, (a) transparency was increasing through the private sector by virtue of electronic platform trading and (b) that expanded high-yield sector price transparency raised certainty liquidity concerns.

At the 2004 TBMA Annual Meeting, a panel of buy-side representatives discussed corporate bond transparency in the high-yield market (held before implementation of Phase III of TRACE). The conclusion was that transparency was aided by electronic trading platform trends. The moderator of the panel commented, "This greater transparency has been driven in part by increased technology, including platforms and increased participation by buy-side and sell-side firms in areas such as high yield."³⁴

TBMA also engaged Greenwich Associates in the summer of 2003 to survey institutional investors on their views of expanded TRACE dissemination prior to the Phase III. About two-thirds reported that they did not find increased transparency to increase their ability to manage their portfolio. They believed that available bid-

³⁴ The Bond Market Association, "Corporate Bond Price Transparency: The View From the Buy Side" transcript (page 3).

price information at that time was sufficient; most believed it is important to have peers' most current post-trade information when planning a trade but nearly half felt it was important not to have their position revealed with much higher percentages of high volume firms and those with positions that trade infrequently expressing concern about revealing their position. The majority did not want intraday dissemination of their trading information; and investors felt the effect of real-time dissemination would be widespread and largely detrimental to the market.

2. Institutional Investor Case Study: How MarketAxess Incorporates TRACE³⁵

MarketAxess' Corporate BondTicker combines the TRACE data with MarketAxess tools and data to provide professional market participants with a comprehensive set of corporate bond price information. The data include actual execution prices—as well as MarketAxess-estimated spread-to-Treasuries—for every trade disseminated by the NASD, as well as prices for certain trades executed on the MarketAxess U.S. platform, many of which are not otherwise publicly disseminated. Corporate BondTicker can be customized, exported into Excel, and is available in real time. The service is intuitive and simple to use and can be accessed through an Internet website, or through an automated download service (FTP).

Immediate Access to Spreads and More

The data represent execution and descriptive information on the most actively traded high-grade and high-yield corporate debt securities as reported through the NASD's Bond Trade Dissemination Service. The daily report includes actual transaction data for more than 10,000 daily trades in over 4,000 unique securities. Data reported for each transaction include:

- Asset Swap Spread
- Estimated spread-to-Treasuries calculated by MarketAxess
- Execution time and date
- NASD symbol
- Quantity
- Price
- Yield
- CUSIP identifier

How Investors Use the MarketAxess TRACE Tool

Bond traders can use the Bond Ticker information in real time to achieve better quality execution. Portfolio managers and research analysts can discern the real levels of credit spreads and examine trends in spread movement. Risk managers and compliance staff can verify pricing and gather data to assess the volatility of credit instruments.

3. Retail Investor Case Study: Investinginbonds.com and TRACE

Investinginbonds.com Overview: Information Available to the Retail Investor

TBMA's investinginbonds.com is the only non-commercial website to offer users free real-time price data for three major bond categories: municipal and corporate data and U.S. Treasury securities. (Treasury data is available after a slight delay.) The site features up-to-the-minute news and commentary and a broad selection of information and educational materials designed to help many different types of investors, from beginners to the most sophisticated bond investor.

A "Markets-at-a-Glance" section offers the investor an array of information, including economic indicators and bond indices, ranging from general market barometers to very specific ones narrowly focused on markets such as corporate or sovereign debt. In addition, the site features a "News & Commentary" section which features daily news updates and regularly updated commentary on specific markets, such as corporate bonds.

³⁵ Adapted from the MarketAxess web site, <http://www.marketaxess.com>

The site is also designed to allow users to easily navigate between sections so they can quickly reach connected and relevant information.

Municipal bond (MSRB) data is available through a searchable database, and investors are able to view municipal bonds by state, credit rating or maturity. They can also view detailed information about a particular security's insurance coverage, rating and call date, as well as its daily high and low prices and its yield to maturity. Investors are able to view the security's trading history and use an on-site calculator to compare taxable and tax-free yields.

How Investinginbonds.com Uses and Disseminates TRACE Data

Through the NASD's TRACE price feed, the Bond Market Association's investinginbonds.com provides retail investors access to the most current post-trade price disseminated information on a real-time, half-hour delayed basis in an easy-to-use format through a searchable database. The information includes real-time transaction information for all retail trades, all investment grade trades and all but the least liquid trades of non-investment grade issues, the latter being available on a delayed basis.

In addition to the TRACE data, the investinginbonds.com site has valuation and analytical tools through partnerships with various information providers and vendors. The information includes historical pricing data, yield and other bond analytics and bond term and condition data. In addition, the investinginbonds.com site provides the retail investor with market content through daily corporate bond commentary and indices. The investor site is further augmented through explanatory information about the TRACE data in a questions and answer format.

The retail investor may select a bond by CUSIP identification, by issuer name, from a listing of the most active bonds of the past week, most recent trades or "browse" by issuer name. Once the bond is selected, by clicking through, the retail investor sees recent prices and analytics including trade date, yield to maturity and yield to call, price, trade size, cash flows coupon, maturity, convexity and duration. The analytics also enable the investor to test different scenarios by changing the bond variables such as call date, maturity or coupon.

4. The Evaluated Bond Price Case Study: FT Interactive Data

Recent trade information does not give the entire picture of bond valuation for illiquid positions that trade on a relatively infrequent basis. For this reason, investors use bond evaluation services to gain a fuller understanding of the current value of such bonds. In short, price evaluation involves constructing a model designed to estimate prices of bonds that have not traded during a given period based on the bonds' key characteristics and on actual market activity.

FT Interactive Data is a leading independent provider of daily evaluations for fixed income securities and a primary supplier of evaluated pricing to more than 4,000 global financial institutions. Backed by 25 years of experience in the bond markets, FT Interactive Data provides daily evaluated prices – known as bond evaluations – for more than 2.5 million debt securities every business day.³⁶ In Europe, FT Interactive Data's coverage (as of February 2005) includes 1,035 government securities, 11,053 non-government securities, 1,016 high yields, 900 emerging market securities, and 1,055 asset-backed securities.

FT Interactive Data's methodology produces bond evaluations that can be an important tool in the valuation process. FT Interactive Data's bond evaluations methodology is based on an in-house modelling techniques – which acknowledge individual bond characteristics such as original terms and conditions, and variable cash flows – combined with a professional evaluation staff who fine tune individual evaluations. The methodologies used include:

- Arbitrage-free, lognormal (risk neutral) short term rate process
- Lattice based, short term interest rate model
- Option adjusted spread (OAS) for bonds with embedded option features

³⁶ FT Interactive Data neither buys nor sells securities for its own account – nor advises customers regarding which securities to buy or sell.

Evaluators integrate relative credit information, perceived market movements, and sector news to derive bond evaluations. Their activities include:

- Creation of constant maturity yield curves to track underlying changes in the benchmark curves and to allow for time decay in the underlying benchmark bonds
- Monitoring markets for news and information impacting credit spreads at issue, issuer, and sector levels
- Researching and adjusting credit spreads to reflect changing perceptions of credit risk; monitoring of primary and secondary market activity as well as considering relative value of comparable bonds
- Interacting with buy and sell side institutions to obtain up-to-date information on recent trade levels and flows

FT Interactive Data utilizes various quality control procedures including comparison reports, monitoring of market news and spread information, periodic spread reviews, and tolerance checks to alert evaluators when daily evaluated price movements exceed a certain threshold.