

Bank of Canada • Banque du Canada



Ottawa

September 29, 2000

Mr. David Brown
Chair
Ontario Securities Commission
20 Queen Street West
Toronto, Ontario
M5H 3S8

Dear Mr. Brown:

The Bank of Canada and the Department of Finance have welcomed the invitation by the Canadian Securities Administrators (CSA) to comment on the Alternative Trading System Proposal (the “Proposal”), and on the previous ATS Proposal. We certainly agree with the underlying view of the Proposal that ATSs should be able to operate independently and competitively in the market and we fully support the CSA’s regulatory objectives of providing investor choice, improved price discovery and reduced execution costs. However, we have serious concerns about key elements of the Proposal and are of the view that, in its current form, it could be harmful to Canadian fixed income markets. The attached background paper prepared by the Bank of Canada elaborates on the issues raised in this letter.

As a general comment, we would note that the rapid pace of technological change is leading to changes in market structures, the form and nature of which are impossible to anticipate. The adoption of prescriptive approaches to regulation could inhibit innovation and undermine the competitiveness of the Canadian markets. Moreover, it risks altering the incentives of market participants in a manner that produces unintended and undesired results. The potential risks of overly prescriptive regulation go beyond the fixed income markets, and pose concerns with respect to other parts of the Canadian capital market.

More specifically, we believe that the Proposal continues to reflect an attempt to impose equity market structures on fixed income markets. As we noted in our comments on the first Proposal, equity and fixed income markets are structurally quite different. Retail participation is much lower in fixed income markets and intermediaries act primarily in a principal capacity. This has important implications for the transparency regime that will best promote market efficiency and liquidity. As discussed in the attached background paper, there is a growing body of evidence suggesting that “one size fits all” is not appropriate when it comes to issues of market transparency.

The Proposal as structured could do harm to fixed income markets in Canada and may result in the creation of a costly market regulatory infrastructure, the need for which has not been clearly established. The imposition of full pre- and post-trade transparency as envisaged in the Proposal could negatively impact liquidity, thereby increasing costs for many investors and borrowers. We know of no major government securities market that requires pre- and post-trade transparency outside of the inter-dealer broker sphere. This is not to suggest that Canada

should not press forward in this area or that a greater degree of transparency across the broader market might not be beneficial. However, an incremental, staged approach would be more prudent than a one-time change in regime given the potential downside risks. The attached discussion paper deals at length with these issues.

We have other concerns with the Proposal. For example, as written, it could be interpreted to mandate immediate disclosure of all bids and offers at Government of Canada securities auctions and repurchase operations. The Proposal needs to be clarified to make it clear that this would not be the case. Moreover, we have some concerns related to the potential role of the Investment Dealers Association as a fixed income market regulator. Finally, while we are strong proponents of initiatives to reduce manipulation of the debt markets such as the establishment of effective front running trading rules, we would note that the trading rules continue to reflect an equity market perspective which may not be completely appropriate for fixed income markets.

Given the complexities of these issues, we concur with the suggestion that the ATS Proposal be split into separate equity and fixed income components. We would note that the dealer community has put considerable effort into the CanPX initiative and it should, in relatively short order, bring transparency in the Government of Canada securities market up to international standards. The ATS Proposal, however, would put Canada very much out of step with international regulatory norms. Given the ease with which trading activity can migrate to other jurisdictions, we would suggest that the CSA adopt an approach to these issues that does not put the Canadian market at a competitive disadvantage and that is broadly supported by market participants.

We reiterate our offer to work with you to improve the effectiveness and integrity of Canadian financial markets. In particular, we would recommend the adoption of a process that would allow more fixed income market participants to provide more direct input into these matters and would be pleased to play a role in such a process.

Sincerely,

Tim Noël
Deputy Governor
Bank of Canada

Bob Hamilton
Assistant Deputy Minister
Department of Finance

c.c. Howard Wetston - Vice Chair

John Stevenson - Secretary

Randee Pavalow - Manager, Market Regulation

Douglas M. Hyndman - Chair, Canadian Securities Administrators

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Submission on the Revised CSA Alternative Trading System (“ATS”) Proposal

On July 2, 1999, the CSA released for comment its Alternative Trading System (ATS) Proposal.¹ The CSA’s intention was to create a framework permitting the competitive operation of traditional exchanges and ATSs. In response to comments from market participants (including the Bank of Canada), the CSA revised its Proposal, releasing a new version for comment on July 28, 2000. The Bank of Canada submission on the revised Proposal is provided in the text that follows.

1.0 General Comments

The Bank of Canada has welcomed the opportunity to comment on this, and the previous version of the CSA ATS Proposal. Given our abiding interest in the efficiency, liquidity, and integrity of Canadian financial markets, in particular the market for Government of Canada securities, and Canadian fixed income markets more generally, we applaud your efforts to improve Canadian financial markets. In the past, we have endeavoured to work with you in achieving these goals through the formulation of appropriate policy, particularly with respect to fixed income markets.

Our analysis of the revised Proposal has identified several areas of concern, especially regarding the transparency requirements, the trading rules, and the IDA’s role as potential market regulator. The purpose of this note is to clarify the reasoning underlying our concerns, and to form the basis for discussions going forward.

While the sections and appendices to follow present a fairly detailed and comprehensive discussion of the transparency issues as we understand them, the central point can be put quite succinctly: The transparency requirements in the Proposal will have a negative impact on liquidity in Canadian fixed income markets -- an impact which will be widely felt. The *mandated* introduction of complete and immediate pre- and post-trade transparency would reduce incentives for dealers to make markets, and also increase the market impact costs faced by both customers and dealers in the course of their trades. As liquidity in secondary markets falls, borrowing costs for issuers (including the Government of Canada) rise.

1. For a full discussion, see the Bank of Canada’s Submission on the CSA ATS Proposal (1999).

Addressing the regulatory approach inherent to the Proposal itself, we are struck by the fact that the CSA seems to be mandating the existence of particular debt market structures in the absence of clear evidence that it is necessary, or even advisable, to do so. Moreover, the direct costs to be borne by debt market participants in meeting the requirements of the Proposal would appear to be significant, (even leaving aside the negative liquidity effects that we envision), and the ad hoc imposition of such costs is an ever more perilous exercise in the present era of increasingly mobile capital markets.

In light of the concerns outlined in this note, we recommend that the CSA go ahead with the proposed measure of splitting the ATS proposal into two separate proposals (one for the equity market, and one for the fixed income market), and that, going forward, the CSA work with the Bank of Canada and other market participants to address these issues.

2.0 Fixed Income Market Transparency

Given the decentralized nature of fixed income markets, the level of price information available to market participants tends to be more limited compared to centralized markets such as equity markets. In general, customers must contact dealers individually to obtain firm quotes. While some dealers post firm quotes on some debt issues via information vendors or their own proprietary trading systems, the associated amounts are smaller than the typically desired customer trading size, and the bid-ask spread is wider than what might otherwise be available through direct bargaining between customer and dealer. In order to obtain the price improvement associated with a larger trading size, the customer is generally required to contact the dealer and negotiate.

The pre-trade price dissemination process described above is referred to as “customer-pull”, as opposed to “dealer-push”. In general, fixed income dealers only offer “real” prices when requested to do so by a customer (customer-pull). Few dealers disseminate (to the market) on a continuous basis, firm quotations (dealer-push). Fixed income securities are so heterogeneous, and market trading so thin, that it is impractical for dealers to continuously update prices for all but the most liquid issues.

Post-trade information is similarly hard to come by. Essentially, the only way for a customer to know the outcome of a customer trade is to be a direct counterparty to it.

One source of price information available to customers is from the interdealer sphere. The CanPX transparency system was designed to display the best bid and ask orders and transactions on Canada’s IDBs (dealers, of course, have access to the information on any of the IDBs for which they have screens). While availability has been unpredictable, and the range of bonds on the system is limited, CanPX does represent a significant step forward.

Although the Bank has generally viewed a greater degree of transparency in fixed income markets as having a positive effect on the efficiency of the market, this has been argued from the initial stand point of there being little or no transparency in the market.

Moreover, there is a growing body of evidence indicating that too much (or too complete) transparency may be detrimental for market liquidity; this is essentially our source of concern with respect to the CSA's mandated level of post-trade transparency, although the Proposal's pre-trade transparency requirements are similarly problematic.

The revised Proposal's transparency requirements for fixed income markets are extremely far-reaching compared to requirements in other countries (see Table 1). Indeed, the Proposal's fixed income requirements are more comprehensive than the equity market transparency requirements to be found in the same document. While essentially all fixed income orders and trades would become fully transparent under the revised Proposal, this does not appear to be the case for equity trades occurring "off-exchange", or in the upstairs market.

TABLE 1. Cross-country Comparison of Transparency in OTC Dealer Government Securities Markets^a

	Canada	Japan	U.K.	U.S.A.
Price Information				
Intraday pre-trade prices	- some dealers post indicative prices on vendor screens	- some dealers post indicative prices on vendor screens	- No.	- some dealers post indicative prices on vendor screens
Intraday post-trade price history	- No.	- No.	- intraday price history announced by LSE for retail trades (less than GBP 50,000)	- some dealers post intraday actual price history on vendor screens
Closing Prices	- daily indicative closing prices for most issues are announced by many primary dealers	- daily indicative closing prices for almost all issues, and average indicative prices for 33 dealers are announced by the Japan Securities Dealers Assoc.	- daily closing prices for all issues are announced by the LSE via the Daily Official List and the "mid-price service" - the U.K Debt Management Office collects end-of-day prices from the GEMMs and publishes them on the wire services	- daily indicative closing prices for most issues are announced by many primary dealers
Volume Information				
Order sizes	- No.	- No.	- No.	- Some dealers indicate, but not entire order book
Intraday history on trade size	- No.	- No.	- Accumulated trading volume available for retail trades (less than GBP 50,000)	- Accumulated trading volume available to the public
Interdealer Transparency System	- CanPX (pre-trade prices and intraday trade history submitted on a voluntary basis)	- No.	- No.	- GovPX (pre-trade prices and intraday trade history submitted on a voluntary basis)

- a. 1997 survey results (B.I.S. 1999), excepting the final row.

It is also important to mention that the trading procedures of certain innovative trading systems are predicated on the assumption of zero pre-trade transparency. Periodic call auction systems such as State Street's BondConnect allow potential buyers and sellers of a security to submit complex and detailed buy and sell orders, which are matched by an algorithm based on a call auction at a certain time. Since clearing prices are only released after the fact, and unfilled orders are never seen, participants need not worry about moving the market against themselves by placing large orders in illiquid securities (such as most debt securities). This type of system is arguably more price efficient than others, but would presumably be prevented from operating in Canada under the Proposal's pre-trade transparency requirements.

2.1 Post-Trade Transparency

As mentioned earlier, it is predominantly the CSA's proposed increase in post-trade levels of transparency offered by dealers (market makers) in fixed income that, in our view poses a potentially detrimental impact on the liquidity of the fixed income market. Specifically, the CSA proposal, if implemented as is, would require dealers to display on a real-time basis to the market/public all of their post-trade prices and volumes.

The real-time display of customer-dealer trades to the market by the dealers has two interrelated detrimental effects on the dealer's willingness or ability to provide liquidity. First, it reduces the dealers desire to compete for customer order flow since they can no longer profit from their proprietary order flow information, as is now the case. In the current opaque market setting, one of the incentives dealers have to compete for customer order flow is to get a better idea of the market wide order flow, gained by having a greater share of the customer orders coming to market. Dealers rebate the profits gained from better order flow information back to the customer by offering customers better bid-ask spreads and greater trade depth, thus increasing the liquidity provided to customers. A second consequence of publishing real-time post-trade information is that the market becomes instantaneously informed about the potentially large, customer orders hitting the market. This causes the dealers, who conduct principal trading and not agency trading, to incur greater inventory management risks as the other dealers who observe this order flow will pre-emptively move their quotes in the interdealer market, which in essence raises the dealer's inventory risk management costs. The dealers will pass on these higher costs directly to the institutional fixed income investors in the form of wider bid-ask spreads and smaller depth, thus reducing market liquidity. In the end, both effects work to reduce the incentives for dealers to act as market makers and provide market liquidity. The reduction in market liquidity provided by dealers can be mitigated by allowing some appropriate degree of delayed trade reporting, which allows dealers time to lay off their inventory risks at lower cost, and by reducing the precision of the information on the size of the order transacted, which helps keep the incentive for dealers to compete for customer order flow intact.

It should be made clear that there is an often cited trade-off that transparency provides: it tends to accelerate revelation of information in price, thus improving market

efficiency, but it impedes the capacity for dealers to provide liquidity. Whether the possible benefits of greater market efficiency outweigh the costs to customers of less market liquidity remains, generally, an unanswered question. The academic literature, however, is able to shed some light on this by examining which types/groups of market participants gain from complete versus incomplete post-trade transparency. The evidence indicates that traders who have a need for immediacy and/or who generally trade larger orders see their utility decrease as markets move to a complete transparency setting.

What does this mean for fixed income markets? Given the fact that this market is almost exclusively populated by large institutional investors who generally require immediacy of trade for relatively large orders, there is compelling evidence to suggest that the CSA's call for full post-trade transparency may in fact be detrimental to the well functioning of fixed income markets. By imposing complete post-trade transparency, the CSA regulation will not only reduce the level of market liquidity observed, which has potential financial stability implications as these markets become less able to absorb large price shocks, but also seems to negatively impact investors.

2.2 Pre-Trade Transparency

The revised Proposal requires that IDBs provide information on all of the securities traded to the data consolidator. This simply amounts to an institutionalization of CanPX, and as such, it is unlikely to be contentious. The Proposal also requires that market makers provide the ask price, bid price, and size of each market maker order, and of each customer limit order that improves the ask or bid price of the market maker's order. This second requirement is difficult to interpret -- while customers do sometimes place limit orders with dealers, one does not usually think of market makers placing orders in that sense (except on IDBs).

There are substantial ambiguities that the CSA must clarify in order to assess the impact of the CSA's pre-trade transparency proposals. In the customer sphere, the meaning that lends itself most readily to "market maker order" would simply be the quotes on securities that dealers offer in response to inquiries from customers, or the firm quotes on smaller trade sizes posted by dealers on some securities. The problem of course is that in the Canadian fixed income market, dealers do not continuously offer quotes (or at least not quotes on large sizes). Thus we see two potential scenarios, one where the CSA would force the "customer pull" pre-trade setting to be transparent, and one where the "dealer push" quote framework is consolidated and made more transparent.

In the first, if the requirement is that market makers submit the quotes that they make, complete with sizes, to the data consolidator for real-time dissemination — *as soon as they are contacted by a customer* — this raises the same problems that we identified in the previous section on post-trade transparency. As soon as a customer starts calling dealers in search of a deal, the entire market will know that someone is looking to buy or sell X amount of a certain security. Under this scenario, the post-trade information requirement will be all but redundant.

A second, much less detrimental scenario would be one in which the dealers set-up systems in which they post continuously firm quotes up to certain size (a relatively small size). This already is done by some dealers. Thus to comply with the CSA proposal would only imply moderate changes to the dealers' way of doing business, since it would simply allow for the centralization of existing and future continuous quotation systems provided by the dealers. Note however, to the extent that dealers provide quotes on bonds that are already being displayed by IDBs (who send these to the information processor), these quotes are likely to be redundant. But, this proposal nonetheless would ensure that a greater array of bond quotes would be displayed on a CanPX type system, since IDB screens have few or no corporate bond quotations.

The Bank of Canada has long advocated increased transparency in fixed income markets from a base of near-zero transparency. However, it should note that, as outlined in the review article by Madhavan (2000),² many studies demonstrate a "Laffer curve" pattern to the effects that greater transparency has on markets. That is, although there is generally a consensus that *some* positive amount of quote and trade disclosure improves market efficiency and liquidity, too much transparency will actually negatively impact markets. Moreover, there is increasing evidence in the literature that the "one size fits all" concept is not most appropriate when considering the amount or extent of transparency that is optimal for different securities or different markets. Unfortunately, the CSA regulations would swing fixed income markets to the point of being nearly completely transparent and it is our view, given our current understanding of the effects of market transparency (and until further research on this question indicates otherwise), that this part of the CSA's proposal is likely to negatively impact market liquidity and increase trading cost for most institutional investors.

GoC Auctions: The lack of precision in the wording of the requirement raises further questions. Does "market maker order" include bids at auction? Primary market activities are not specifically excluded from the requirement; this will need to be clarified. Repurchase operations are also something to consider. Real time, market-wide dissemination of participant bids is unprecedented, and would have serious implications for the auction process. CSA ATS rules must not impinge primary issuance by the Government of Canada.

3.0 Suitability of the IDA as Fixed Income Market Regulator

Before going on to discuss the IDA's possible role as market regulator, a few words are perhaps in order regarding the need (or lack thereof) for the role itself. While it is true that Canadian fixed income markets currently operate without the type of detailed market surveillance described in the Proposal, we are not aware of the compelling reasons for it to be introduced. Furthermore, given the amount of resources which would be required to do so, we would like to suggest a thorough examination of the costs and benefits.

2. Madhavan, Ananth 2000. "Market Microstructure: A survey" Marshal School of Business, USC, Mimeo, March. For another good review on market transparency issues see also: Holland, A., "The Academic Literature — A Brief Review" annex in *DMO Consultation Paper on the Secondary Market for Gilts*, January 2000.

While the Investment Dealers Association (IDA) may be a possible entity to take on the fixed income market regulator role envisaged in the revised Proposal, there remain some unanswered questions. Our concerns centre on the IDA's current regulatory jurisdiction, and on the nature and extent of the proposed IDA role, in comparison to the scope of its current regulatory activities.

The IDA currently has regulatory jurisdiction only over its members, which comprise a sub-set of fixed income market participants. Some chartered banks, such as Schedule II banks, and also customers, some of whom are larger players than Primary Dealers in Government of Canada debt, are not under the IDA's oversight. Nor are offshore participants. As the CSA has noted, it would first be necessary for the IDA to gain jurisdiction over all participants. However, it is not self-evident how this might be accomplished, since the Investment Dealers Association presently exercises regulatory power only over its members (i.e., investment dealers), and the slate of other debt market participants may not be suitable candidates for membership.

Additionally, the revised Proposal seems to imply a type of market surveillance that the IDA does not currently provide, and indeed may not be able to provide, given its current structure and the level of resources that it applies to the task of surveillance. The transparency and audit trail requirements, if enacted, would put a wealth of trade information at the market regulator's disposal. Some exchange market overseers, such as the TSE, already receive information of this type, and apply a certain amount of resources to analysing trade information (looking for abnormal price movements in advance of market moving information releases, for instance). It should be recognized that the IDA does not perform this brand of active surveillance over its members' dealings, and that to begin to do so would necessitate a major change in its operations. It is also very unclear who would absorb what are likely to be very significant costs related to the monitoring infrastructure outlined in the Proposals.

4.0 Trading Rules

In addition to some specific issues related to rule 4.1(1) on front running (see below), we note with concern that the trading rules in the revised Proposal do not appear to be aimed specifically at fixed income markets, but rather at equity and exchange-traded markets, with certain exemptions and modifications seemingly added as afterthoughts. It is our view that the markets are sufficiently different as to justify separate treatment, and moreover that a "one size fits all" approach is not appropriate here. We would like to urge the CSA to look closely at the formulation and wording of IDA Policy No. 5 for guidance in devising a set of rules aimed specifically at debt markets.

4.1 Front Running

While trading rule 4.1(1) on front running as it is currently worded would not seem to apply to trading in Canadian fixed income markets (i.e., it refers only to trading on a marketplace, and no entities in Canadian debt markets currently fall under that definition), it is our understanding that this was not the CSA's intention. Applied to fixed income markets, rule 4.1(1) would prevent some of the legitimate activity that currently takes place. It is important to recognize that securities dealers in Canada's

fixed income markets service their customers by buying and selling for and from their own inventories, and not on an agency basis, as is often the case in equity markets. Customer orders are often very large, sometimes in the range of hundreds of millions of dollars per trade, and the market risk accepted by dealers in making these principal trades can be substantial.

In conducting trades in situations such as these, *customers often give advance warning of an impending order to the dealer with whom they wish to transact*, in order to give the dealer time to adjust the risk profile of their book (e.g., by hedging with futures). Without time to adjust the risk profile of their book, the prices quoted by market makers would necessarily adjust to compensate for the magnitude of risk, therefore increasing transactions costs for their clients.

The revised Proposal's rule on front running would effectively prohibit certain aspects of legitimate market activity, of which the situation described above is a relatively straightforward example. Other common situations involve the leading underwriter of a debt issuance making trades in anticipation of their client's needs on the issuance date (e.g., to unwind a rate lock, or to undertake a fixed-floating swap of their new obligation). Since activities of this type improve the ability of market makers to provide liquidity, and therefore result in better quotes for their customers, the interests of investors would not be served by the elimination of these practices.

This is not to say that true front running is somehow acceptable in fixed income markets -- far from it. We applaud the CSA's goal in seeking to eliminate this and other forms of market manipulation. At the same time, it seems clear that more work needs to be done in formulating rules that will be effective in achieving this goal with respect to fixed income markets.

Appendix I: Transparency - An Academic Literature Review

Introduction

Until recently, research in market transparency focused mainly on equity markets, which unfortunately differ in many respects from debt markets. Fixed income markets differ in several ways. First, there is a much greater degree of heterogeneity of securities in fixed income markets where hundreds of thousands of different securities exist while there may be a few thousand equity securities in existence. Moreover, relative to equity markets, fixed income market trading is characterised by a small number of very large trades. The average number of trades a day in Canada rarely exceeds 500 in fixed income markets while the equity market observes tens of thousands of trades a day. The dollar value of fixed income trades on average are in excess of \$5 million, relative to the average size of TSE trades of approximately \$38,000 (August, 2000). A second way in which these markets differ is that expectations of macroeconomic fundamentals such as future inflation affect the price of bonds. The expectations change with the release of public information such as the latest GDP growth figures. As such it is unlikely that individual market participants will have superior information about bond fundamentals relative to the market as a whole. Given this, order flow information in the fixed income market does not play the same role it does in equity markets where the market is characterised by significant amount of private information on the fundamental value of the security and where uninformed market participants value/use the trading information as a way to assess the security's fundamental value. Thirdly, most equity markets are centralized markets (usually via an exchange) where an order-book system allows offsetting orders to be matched in a non-discriminating manner, predominately on an agency basis. Fixed income markets, on the other hand, are set up as decentralized dealership markets, in which dealers stand ready to make markets in the security. These differences make it difficult to apply the results from the earlier and some of the more recent research based on equity market attributes to fixed income markets. However, some of the recent research that attempts to take into account the various dealership market structures has shed some light on the effects of transparency in these markets.

In order to classify the existing research it is useful to first make the distinction between post-trade and pre-trade transparency. Markets are pre-trade transparent if participants can view existing (firm) quotations (price and size), while post-trade transparency refers to the extent to which completed trade information (including time, price, size) is released to the public. It is also useful to note that the fixed income market is organized along two parallel and, in effect, separate markets: a public trading environment where customers first trade with market makers, what we call the customer-dealer sphere, and a interdealer trading environment, where dealers then trade among themselves, what we call the interdealer sphere. In the interdealer sphere, dealers have the choice of either trading bilaterally with each other or trading indirectly and anonymously with each other via an interdealer broker (IDB).

Theoretical literature

Pagano and Roell (1996) compare trading costs associated with a dealership market versus a completely transparent order-book market. They show that large traders are better off when trading on the opaque dealership market while small traders are better off in the transparent order-book market. The drawback with their research is that they assume traders don't care about the trade execution speed (the ability to complete immediate trades). Second, because they don't compare an opaque dealership market with a less opaque dealership market, but rather compare a dealership market against an order-book market, they are in fact not simply assessing the affects of changing transparency levels but also assessing the relative usefulness of different market structures.

Madhavan (1995), shows that large institutional traders, who do not trade on information related to the fundamental value of the security and who break up their large orders into multiple trades, are better off in an environment of less post-trade disclosure since it reduces their execution costs. That is, large orders can be completed without moving the price in the direction of the trade. Small, uninformed traders (uninformed in terms of the stock's fundamental value) on the other hand are shown to be better off with greater post-trade information release. In his review paper, Madhavan (2000) states that the implication of this research is it "suggests that one danger of too much transparency is that traders might migrate to other venues,...." (p. 38). This is particularly relevant for decentralized fixed income markets in which trading of any debt securities (including Canadian bonds) takes place in many financial centres around the world, since this implies that large liquidity driven institutional investors could easily migrate their fixed income trading activity to off-shore, more opaque locations. That is, market makers may choose to book their trades in centres with looser transparency regulations — a form of regulatory arbitrage. In fact, the empirical study by Pagano and Steil (1996) suggests that Nasdaq market makers engaged in regulatory arbitrage by booking large trades they undertook in cross-listed shares on the London Stock Exchanges where there were no publication requirements rather than reporting the trades on the Nasdaq.

Naik et al. (1999) findings are of particular interest since they develop a theoretical model that most resembles dealership markets, which is not the case in the Madhavan (1995) and Pagano and Roell (1996) studies. The innovation in their approach is that they model the trading that takes place as a two stage process in which the dealer first trades with the public investor and then re-trades in order to manage the inventory position that was taken on in the initial public trade. The key and realistic feature of their model is the fact that the price the dealer offers to the public investor (in the first stage of trading) will depend on its ability and costs to managing its inventory position. As such they find it essential to model the second stage in order to understand how prices are set in the first stage. An additional innovation over these latter two studies, where public investors were assumed to be unaffected by changes in risk when trading (i.e., they are risk neutral), is that Naik et al. also model both the public investor and the market maker as being risk averse and, as such, sensitive to price risks. Naik et al. show that order flow is informative and that dealers will compete for that information by offering preferential quotations. This means that, in contrast to order-book markets, bid-ask spread spreads do not necessarily increase monotonically with the size of the

order, since dealers may rebate the information they gain from the order flow received back to the public investors. This is an important finding for markets which are predominated by large institutions with large orders to transact. The authors also show that an increase in the level of post-trade transparency works against the execution of large trades but nevertheless tends to benefit the small traders.

Lyons (1996) also attempts to model the risk sharing aspects of dealership markets. He too models the realistic feature of two-stage trading in multi-dealer markets. Lyons presents a model of the foreign exchange market (which is very similar to the fixed income market in terms of trading structure and the characteristics of the market participants). His model allows dealers to off-load their order flow to other dealers in the second stage of trading after having traded with customers in the first stage. Lyons considers the optimal level of transparency in interdealer trading that dealers would choose. He does not examine the optimal level of transparency for the market as a whole (or what would be the level of transparency the investors would choose). This question is of interest since the FX market is one that is unregulated and yet there is a degree of transparency that has arisen without regulatory prodding.³ Lyons shows that dealers, if they could choose the transparency regime *ex ante*, will prefer incomplete transparency over both a completely opaque setting and a completely transparent setting. The key insight that explains this finding is that incomplete transparency allows for the optimal level of risk sharing to occur in the market. If there is no transparency, customers do not wish to trade and as such dealers cannot share the price risk borne by themselves in the first round of trading. Under complete transparency, the dealers bear all the price risk (in the first round) and sharing this risk by trading with customers in the second round is moot. In essence, by having some positive level of transparency, customer trading activity is sufficient that they trade with dealers quickly enough (or early enough in the trading session) as to allow dealers to lay off some of the price risk on the broader community that includes the customers. If post-trade transparency is complete, prices adjust (nearly) instantaneously and dealers absorb all the price risk instantaneously. As such dealers will prefer some middle ground of transparency. The incomplete degree of post-trade transparency modelled by Lyons is analogous to having the post-trade data from a subset of participants being made public. This is, in fact, what the publication of IDB post-trade data does (i.e., something like CanPX does this). It provides some degree of incomplete post-trade transparency.

Empirical literature

Gemmill (1996) examines how changes to the transparency regime on the London Stock Exchange (LSE) that occurred in 1989 — at that time structured as a dealership market— affected market efficiency and liquidity. In reviewing the data that spanned from 1987 to 1992, Gemmill found no evidence that prices adjusted less quickly (in reaction to news or trading) after a sharp reduction in transparency. His findings agreed with those of Breedon (1993) who analysed a smaller sample of LSE stocks around the same time span. Overall, these results *do not* support the hypothesis that *an increase in post-trade transparency will improve market efficiency*. Both studies also found that on average, the relative spreads (measured as the actual price paid compared to the going

3. For example, in the FX market dealers can observe the order flow that goes through the IDBs.

quote and is used to take into account negotiated price improvements) for large trades versus small trades were narrower under the low transparency regime. All in all, these studies did not reveal any statistically significant effects of decreased post-trade transparency.

An interesting study that lends more support to the idea that excessively stringent disclosure requirements creates incentives for dealers to engage in “regulatory arbitrage” is that of Porter and Weaver (1998a). They find empirical evidence indicating that on average the trades reported late (or out-of-sequence) by Nasdaq dealers tend to be large trades and those that are at away prices. The evidence is consistent with the arguments that large trades benefit from delayed reporting.

Porter and Weaver (1998b) also investigates the effects of greater pre-trade transparency using data from the TSE. A regime change in pre-trade transparency occurred on April 12, 1990 when the TSE started providing real-time public dissemination of the firm quotations for up to four levels away from the inside market (in both directions). Porter and Weaver find that there is a decrease in liquidity, measured by the realized spread, with the increased transparency regime.

Generally, there is little empirical evidence supporting the theoretical hypothesis that market efficiency and public investors’ welfare is improved. However, these studies are carried out as event studies and as such changes directly resulting from the changes in transparency regime are difficult to distinguish from other unrelated changes that may have occurred during the sample period in question. Given this, it is important to find a “cleaner” environment in which to test the effects of transparency changes. One avenue of research that has recently come along that should help is that of “experimental markets” in which markets are simulated in a controlled (laboratory) environment.

Another potential drawback of the empirical research is that it has examined transparency regime changes that have occurred on equity markets which, as was mentioned above, differ in many respects from fixed income markets. Ignoring for the moment the difference that exist between the securities’ and trader’ characteristics for equity and debt instruments, the empirical research on the LSE or Nasdaq may nonetheless provide some useful insights since they are structured as dealership markets as are fixed income markets (but differ in that they are centralized markets).

Experimental literature

Perhaps the research of most direct relevance to helping resolve what is the appropriate level transparency in a market, is that based on experimental economics in which we can test hypotheses in a control environment.

Bloomfield and O’Hara (1999) examine the impact on price discovery and market liquidity of changes in the level of transparency in a multiple dealer market. They examine three transparency settings: 1) an opaque setting where customers see neither pre-trade nor post-trade information, 2) a semi-opaque where customers see the firm quotations posted on a centralized display (a pre-trade transparent setting), and 3) a transparent setting which is the same as the semi-opaque except that transactions prices and volume are public as well (i.e., pre-trade and post-trade transparent). They find that

price efficiency is not significantly affected when going from opaque to semi-opaque, but find that prices move rapidly to their new fundamental level (when new information about the fundamentals is released) in the transparent setting.⁴ They also find that changes in transparency cause significant change in the traders' profits. As in most research in this area, by separating the traders into three groups (informed traders [insiders]), uninformed/liquidity traders, and dealers), they show informed traders are made worse off in by going to the most transparent setting. This is not surprising since it is predicted in the theoretical work (since these traders can no-longer profit from their insider information when trading is transparent). (Note that there was no significant change in the traders' returns when going from the opaque to the semi-opaque setting.) However, the liquidity traders (who need immediacy) are made significantly worse off in the transparent setting. This is surprising since it contradicts the findings of Pagano and Roell who predict that an increase in transparency would shift the distribution of returns from the informed traders towards the uninformed, liquidity traders. They also find dealers compete less for order flow and spreads are wider in the transparent setting.

Flood et al. (1999) also conduct an experimental economic study modelled as a multiple dealership market. Their work differs in that traders face a time pressure which places a greater emphasis on the trader's learning ability. Also, they only examine changes in pre-trade transparency, leaving the post-trade environment opaque. They find that as the level of pre-trade transparency increases, that trading activity increases, although the returns of the traders are not significantly affected in a statistical way. However, surprisingly they find that greater pre-trade transparency slows down this price discovery process (i.e., price efficiency is significantly decreased). This is in marked contrast to the Bloomfield and O'Hara (1999a) study and to much of the theoretical literature on transparency. They hypothesise that this is due to the fact that dealers, given that they no longer need to seek out pre-trade information by calling for and making quotations, become less aggressive price setters in the more transparent setting and, as such, the price converges more slowly to the one predicated by fundamentals. In essence the greater transparency reduces the incentives of the dealers to acquire new information (which in turn is then revealed/embodyed in the price).

Although both of these studies replicate many of the features of a dealership market, one feature that is not replicated, is the dealers' ability to trade amongst themselves via interdealer brokers. The dealers' exclusive access to this platform and the fact that IDBs tend to provide a partial signal of the market wide order flow, may play a vital role in increasing the price efficiency of the market. We hypothesise that any additional degrees of transparency imposed on a multiple dealer market that has IDB systems, would likely yield little price efficiency improvements.

Another interesting experimental study that sheds some light on regulatory arbitrage questions is that by Bloomfield and O'Hara (1999b) in which dealers can either be those that disclose their trades (thus being post-trade transparent), and those that do not. They find that non-transparent dealers are more aggressive at setting quotes and

4. Price efficiency is defined as the speed with which the price converged to the fundamental value of the securities. Alternative, it is the speed with which information is embodied into the price.

allows them to capture more order flow. This greater share of order flow in turn provides them with an informational advantage (over the disclosing dealers) and allows them to quote narrower spreads (which, although not directly examined in the study, in principal benefits the non-dealer traders). In the end, the low-transparency dealers' profits are significantly higher than transparent dealers'. Bloomfield and O'Hara (1999b) suggest that markets will naturally gravitate towards less transparent regulatory settings.

In all the experimental studies discussed above, informed traders are assumed to be active. In fixed income markets, where it is hard to imagine a situation where an investor has superior (insider) information as to the value of the security, it is likely that this type of trader does not exist or comprises a minority of the investors. As such, the gains and losses of the uninformed, liquidity trader would be more directly affected by changes in transparency, than in a market where there is a mix of two different types of investors (accounts).

Concluding Remarks

To summarize, it seems that there exists no optimal market structure, in terms of transparency, that would benefit all types/groups of market participants, nor accommodate, at the same time, increased market efficiency and liquidity. As such, the current state of research calls into question the view that increased transparency is unambiguously beneficial for markets, and suggests that market structure should be an important consideration in assessing the appropriate transparency regime.

Appendix II: U.S. Fixed Income Market Transparency Initiatives and Regulation

The regulatory push for improved transparency in the US debt market gathered steam in the late 1980s, fuelled by the perceived slow pace of the industry. IDBs had begun to distribute current bids and offers to their dealer clients in the 1970s through the screen-based system. Customers, on the other hand, were only offered access to indicative quotes by way of data vendors, and this some time later. By the mid-1980s, the transparency situation had not seemed to improve substantially, and some sort of government intervention began to look like an attractive option to regulators. To that end, two Congressional studies took place over the next five years, and the governmental bias moved towards intervention to remedy the situation.

The U.S. industry reaction appears to have been to pre-empt potential regulatory moves by acting first to make the improvements desired. This strategy appears to have been quite successful to date. The SEC's first target was the Treasury market, by virtue of its size and importance, but they now avow to be satisfied with the level of transparency offered by the industry-sponsored GovPX system, which displays real-time interdealer trade information. Regulatory focus has since moved on to the corporate and municipal bond markets, where transparency improvements have lagged behind.

Debt market transparency initiatives in the U.S. have been made largely by market segment with each segment's developments more or less independent of the others'. In 1998, the SEC conducted a Commission Review of Debt Markets, and the conclusions of that report seem to form the basis of the SEC's current thinking and stance. In the report, the SEC identified the corporate debt market as the only segment which lacked almost any transparency. The following subsections will present a summary of the state of affairs with respect to each segment's level of transparency, and the current stance of regulators.

Treasuries

Since its introduction in 1991, the industry-sponsored GovPX system has come to offer the latest interdealer trading information on a wide range of Treasury and agency debt securities. The SEC now considers the quality and timeliness of price information on the system to be "extremely good", noting that the improvement was accomplished, not by regulation, but by merely the threat of regulation.

Municipals

In 1995, with the encouragement of the SEC, the Municipal Securities Rulemaking Board (MSRB) began to collect and distribute the details of interdealer, and later customer-dealer trades. The MSRB now publishes daily reports, but intends to shorten the time delay going forward; the SEC has expressed pleasure with these developments.

Although municipal debt securities is the smallest US fixed income market segment, it has the heaviest participation from individual investors. The SEC has therefore considered transparency in municipals to be particularly important for reasons of fairness.

Corporates

As mentioned above, the SEC's 1998 report found the level of transparency in the U.S. corporate debt market to be sorely lacking, and in September of that year, Chairman Arthur Levitt made a much-publicized speech wherein he reported on recommendations which had been made to the National Association of Securities Dealers (NASD). The SEC had asked the NASD to adopt rules requiring dealers to report all transactions in US corporate bonds and preferred stocks, and to develop systems to redistribute transaction prices on an immediate basis.

The NASD's proposal based upon the SEC recommendation has evolved slowly since 1998, and events have over-taken them to an extent. First, the Congressional hearings took place and have led to a bill being passed in the House (although not the Senate). Second, the NASD and the industry have moved forward with an industry-sponsored system by the name of Corporate Trades I, which publishes trade information at the end of the day.

In the aftermath of the Chairman's speech, there were Congressional hearings on the subject, and objections were raised to the Chairman's mandated level of transparency. The principal objection offered was centred on the fear of negative liquidity impacts stemming from an excessive level of transparency. Of note, the SEC has described the liquidity argument as "*not implausible, and therefore not easily dismissed*". The House bill, which passed in the aftermath of the hearings, would extend transparency requirements far in excess of the NASD's current proposal. Compared to the 30,000 to 40,000 securities to be covered under the NASD's plan, the House bill would cover all of the approximately one million securities in the US corporate market. The bill needs to be passed by the Senate before coming into law, however, and the prospects of that happening do not appear to be good.

The industry sponsored Corporate Trades I has also moved somewhat ahead of the NASD's proposed rule changes. The system provides trade information free to the public on an end-of-day basis. While acknowledging it as a positive step forward, the SEC finds fault with the following features: (1) only interdealer trades on investment grade bonds are covered, (2) participation is voluntary, (3) reporting is only at the end of day, and (4) the small number of transactions reported (typically 100 transactions per day, compared with upwards of 5000 trades daily in the institutional market alone).

The NASD's long-awaited proposal, which was released in October, 1999, would require members to report all covered secondary market transactions to a system to be developed by Nasdaq: the Trade Reporting and Comparison Entry Service (TRACE). Reportable debt securities would include investment grade, high yield, and unrated debt, medium-term notes, convertible bonds, capital trust securities, floating rate notes, and global bonds.

Following six months of collecting information, TRACE would begin to report trade information to the public with a time delay of 15 minutes. First to be phased in for public dissemination would be mandatory FIPS issues and convertible bonds, followed by others (in alphabetical order), over the following two months. At that stage, the NASD would examine the possibility of further reduction in the post-trade reporting window, looking at the potential negative liquidity impacts of such a move. Under the Proposal, post-trade information would feature the trade price, and a size indication of \$1 million+ if the trade is between one and five million dollars, or \$5 million+ if the trade size is greater than five million dollars.

Concluding Remarks

Several observations can be made with respect to the U.S. experience with debt market transparency, and regulation thereof:

- The SEC has been content with less-than-complete transparency in U.S. debt markets: (1) The Treasury market is transparent only for some trades in the interdealer market. (2) Trade information in the municipal bond market is disseminated only at the end of the day. (3) The NASD's corporate market transparency proposal (which has been met with controversy, and has not yet been accepted) mandates dissemination of trade information on a sub-set of corporate bonds, delayed by 15 minutes, and featuring only an imprecise indication of trade size.
- Industry-led initiatives have been allowed to take the lead in meeting the SEC's debt market transparency requirements.
- Despite the fact that the U.S. Treasury market is the most liquid fixed income market in the world, and would seem therefore to be the least imperilled by such potential dangers, the SEC has characterized negative liquidity impact arguments of the type presented in section 2.1 of this note as "not implausible, and therefore not easily dismissed."
- The SEC in its transparency-related regulatory efforts has dealt with equity and debt markets separately, and has dealt with individual fixed income market segments on a case-by-case basis.

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