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The Impact of Structural Embeddedness on Perceived Trust on Alternative Trading Systems, Trading Cost, and Access to Information in the Fixed-Income Market

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ABSTRACT

The fixed income (FI) market is a financial market where debt securities are traded commonly in the form of bonds. Unlike equity securities which are traded on exchanges, the debt securities are primarily traded in over-the-counter (OTC) markets. While the use of electronic trading systems in the fixed income market is growing, the majority of the FI market is still driven by broker-dealer relationships with traders heavily relying on the phone-based communication for their trading. The concept of embeddedness has been used in several studies to explain the economic behavior and emergence of social relations in organizations. This research-in-progress is guided by these questions: What is the extent of embeddedness in the fixed income market? What is the relationship between a financial institution’s embeddedness and its trading cost and access to privileged information? What is the impact of a financial institution’s embeddedness on its perceived trust on alternative trading systems and the telephone system?

Keywords
Structural embeddedness, electronic trading, alternative trading systems, perceived trust, fixed-income markets.

INTRODUCTION

The fixed income (FI) market, which is also known as the debt, credit, or bond market, is a financial market where debt securities are traded commonly in the form of bonds. The FI market is heterogeneous as debt securities differ from each other in several aspects such as their legal complexity, duration, credit risks, and liquidity. FI securities are initially issued in primary markets usually in the auction format and thereafter traded in secondary markets. The secondary markets, which are over-the-counter markets, rely on the telephone-based communication and private electronic networks. There are three major participants in the FI market: issuers, intermediaries, and investors. The issuers, also known as the sell side, issue debt securities in this market. They include governments, municipalities, corporations, commercial banks, and foreign institutions. These actors participate in the market to get a fair price for their securities, to be able to refinance outstanding debt, and to design, price, and distribute future issues while minimizing transaction costs. The intermediaries typically engage in matching the buyers and sellers of debt securities. However, they may also purchase and sell with their firm’s capital resources to improve their own position or that of their clients. Investment banks, commercial banks, foreign banks, and interdealer brokers serve as intermediaries in the FI market. They generate revenues by underwriting, pricing, and distributing securities in the primary market. The dealers are important financial intermediaries who serve as an aggregator and disseminator of market information and research. They also protect issuers and buyers against potential counter-party risks. The interdealer brokers assist the dealers in executing proprietary trades anonymously and receive commissions for their work. The investors also known as the buy side, buy debt securities to create diversified portfolios and get advice from experts on changing market conditions and their impact on portfolios. The government, pension funds, insurance companies, mutual funds, commercial banks, foreign institutions, and large corporations are major investors in the FI market.
During the late 1990s, the computing and communication technologies changed the landscape of financial markets by introducing electronic trading systems which reduced trading costs, as well as improved the liquidity and efficiency of trading. The trading costs involve explicit costs and implicit costs. The explicit costs can be minimized by linking the execution, clearing, and settlement of trades to the procedures for controlling the market and operational risks through automation. Electronic trading systems lower the explicit costs by the straight-through-processing (STP) arrangements which enable the trades to pass automatically through to the final settlement without further manual intervention. The implicit costs, on the other hand, consist of bid-ask spreads and market impact costs. The bid-ask spreads paid by the users of dealer markets can be viewed as charges for accessing the market. The market impact costs refer to the adverse impact on price as a result of information leakage ahead of execution. Both explicit and implicit costs have significantly decreased following the advent of the electronic trading systems. The liquidity refers to the traders’ ability to trade when they want to trade. It increases the effectiveness of the market because it reduces costs by narrowing spreads and increasing depths so that particular trades will not have significant impact on the overall functioning of the market and prices. The trading efficiency refers to the premise that current prices reflect all information that traders can acquire and profitably trade upon. There are three levels of market efficiency: weak, semi-strong, and strong. Markets are weak-form efficient if current prices reflect all historical price information. Markets are semi-strong-form efficient if current prices reflect all publicly available information (including historical price information). Markets are strong-form efficient if prices reflect all available information, public or private.

The FI securities traded on over-the-counter constitute a significant portion of modern financial markets with the transaction size of about $45 trillion (Montazemi and Siam, 2006). In recent years, there has been a significant growth in electronic trading systems with about 100 different trading platforms currently available in the FI market. According to the Securities Industry and Financial Markets Association (2008), the fixed-income trading systems can be divided into two classes depending on the participants and how they trade with each other, and the methodology used for price discovery and trade execution. In the former category, there are three platforms: inter-dealer, dealer-to-customer, and new-issue platforms. The inter-dealer platforms, which are also known as B2B platforms, support trading only among broker-dealers and enable anonymous trades among dealers. The dealer-to-customer platforms, also known as B2C platforms, support trading between broker-dealers and investors. The new issue platforms support sales of new bond issues to either broker-dealers or institutional investors or both. In the latter category, the electronic trading platforms can be viewed as: request-for-quote systems, order-driven systems, market-making or cross-matching systems, and auction systems. The request-for-quote systems allow investors to request executable price quotations from broker-dealers. The order-driven systems allow participants to enter quotations into a central order book which can be viewed and executed by all other participants on the platform. The market-making or cross-matching systems bring dealers and investors together and display their order electronically if a match is found. These systems allow participants to make ongoing buy and sell quotations during the trading day. The auctions systems, primarily used for new-issue sales, facilitate the trading of debt securities through an auction mechanism by providing detailed information about securities and allowing the participants to bid simultaneously for a securities offering. Table 1 summarizes the major characteristics of the FI trading systems.

While the electronic trading systems have provided several value added services such as the higher speed and scope of market information, reduced transaction cost and processing errors, and increased liquidity, their use in the FI market is not as common as in equity markets because debt securities are far less homogenous, less liquid, and traded less often than equities (Bakos, 1991). Also, the market microstructure of bond securities has been much less studied than that of equity markets (Goodhart and O’Hara, 1997). Fan, Stallaert and Whinston (2000) emphasize that less liquid debt issues with exotic characteristics may not be appropriate for trading in automated systems and suggest a need to create a larger liquidity pool to facilitate their electronic trading. In a more recent study, Montazemi and Siam (2005) find that the fixed income market is built around the exploitation of information asymmetry and that the telephone system remains the primary mode of information flow between buyers and sellers as it helps in preserving such asymmetry. They also notice that automated systems are disruptive to the FI industry structure and that actors in the FI market access privileged information by exploiting their personal ties and social structures. The heterogeneous and complex structure of the fixed-income market makes it difficult to concretely identify what constitutes a single best execution. According to the Securities Industry and Financial Markets Association (2008), it is “an asset manager's duty to determine and evaluate the circumstances under which the overall value of investment decisions for its clients with respect to those securities will be maximized.” Factors such as the likelihood of execution within a desired time frame, the ability of the counterparty to act on a confidential basis, the creditworthiness of the counterparty in relation to the risk created by the transaction, and the counterparty's reputation for the ethical behaviour are of paramount importance in FI transactions.
Classification based on Trading platforms/systems Characteristics

Participants and how they trade with each other.

<table>
<thead>
<tr>
<th>Inter-dealer</th>
<th>B2B platform</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dealer-to-customers</td>
<td>B2C platform</td>
</tr>
<tr>
<td>New-issue</td>
<td>Supports sales of new bond issues</td>
</tr>
</tbody>
</table>

Methodology used for price discovery and trade execution.

<table>
<thead>
<tr>
<th>Request-for-quote</th>
<th>Enables investors to request executable price quotations from broker-dealers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Order-driven</td>
<td>Enables participants to enter quotations into a central order book</td>
</tr>
<tr>
<td>Market-making or cross matching</td>
<td>Brings dealers and investors together and display their order electronically if a match is found</td>
</tr>
<tr>
<td>Auction system</td>
<td>Facilitates the trading of debt securities through an auction mechanism</td>
</tr>
</tbody>
</table>

These findings underscore the importance of personal ties and social structures in FI transactions. The concept of embeddedness has been used in several studies to explain the economic behaviour and emergence of social relations in organizations. In this research-in-progress, we employ the notion of embeddedness to investigate the following: What is the extent of embeddedness in the fixed income market? What is the relationship between a financial institution’s embeddedness and its trading cost and access to privileged information? What is the impact of a financial institution’s embeddedness on its perceived trust on alternative trading systems and the telephone system? The remaining of the paper is organized as follows. In the next section, we expound the concept of embeddedness in financial institutions. Thereafter, we outline our research hypotheses. The paper concludes with a brief discussion of the proposed methodology.

EMBEDDEDNESS IN FINANCIAL INSTITUTIONS

The neoclassical framework of human behaviour assumes that individuals are rational, isolated homo economicus\(^1\) actors always striving to maximize their utility. However, this is not a realistic model of human decision making as individuals, due to their bounded rationality, do not necessarily always optimize but “satisfice\(^2\)”. Also, the presence of transaction costs and the inevitable complexity of financial markets make efficiency a theoretical concept only. The functionalist paradigm of the neoclassical framework emphasizes the objective knowledge and rationality while completely ignoring the role of personal ties and social actions embedded in financial markets. It is not difficult for anyone visiting the Toronto Stock Exchange or the Wall Street to notice the prevalence of network ties among market participants and the premium on inside information. Modern financial institutions, which rely on the private, dedicated digital networks, have transcended the duality of medium (physical vs. non-physical) and reach (local vs. global). For example, all hardware and communication networks of a brokerage house in Toronto can be viewed as physical and local while its knowledge, expertise, and corporate norms are non-physical. Also, the brokerage house possesses a global reach as its real strength comes from thousands of investors and information seekers distributed all around the world. In this sense, financial institutions possess both physical/non-physical and local/global attributes simultaneously. The deterministic, functionalist viewpoint, which cannot transcend the inherent duality of technology and organizations, has become so disengaged from the cultural context that it has little useful to say (Frankfurter, Carleton, Gordon, Horrian, McGoun, Philippatos and Robinson, 1994).

\(^1\) Homo economicus, or the Economic man, is the concept in some economic theories of man as a rational and self-interested actor who desires wealth, avoids unnecessary labour, and has the ability to make judgments towards those ends.

\(^2\) Satisficing is a decision-making strategy which attempts to meet criteria for adequacy, rather than to identify an optimal solution.
The sociological framework, on the other hand, underscores that markets be studied as a subsystem of a larger social system because social relations are fundamental to the market process (Granovetter, 1985). An action is called social if it is relational by accounting for others’ actions and behaviours (Weber, 1978). There are two schools of thought in the economic sociology: substantivist, and embeddedness. The substantivist school views every attribute of markets as social and therefore tends to be over-socialized. On the other hand, the embeddedness approach contends that while the goal of individuals is still to maximize their utility, they attempt to achieve that objective not necessarily through the optimization-based rationality but through the exploitation of social networks built around their personal relationships, trust, and goodwill. In this sense, the embeddedness notion is close to Habermas’s3 concept of communicative rationality which states that actors in a social network assimilate and apply their knowledge in any manner to achieve their personal and social goals. For example, an investor’s response to published price quotations in an electronic trading system constitutes only a visible and superficial interaction in financial markets. What ultimately leads to an order execution is the invisible interaction emerging from his or her personal ties and social networks shaped by the years of organizational culture, experience, rules, and regulations.

Historically, the notion of embeddedness had its root in the work of Polanyi (1944) which became a central concept in the economic sociology following Granovetter (1985). While the term embeddedness generally refers to the process by which social relations shape economic action (Uzzi, 1996), it is not difficult to come across several definitions and variations in the literature. For example, Zukin and DiMaggio (1990) classify embeddedness as political, cultural, structural, or cognitive whereas others analyze it at micro and macro levels (Fletcher and Barrett, 2001; Halinen and Tornroos, 1998). Uzzi (1996) used the concept of structural embeddedness to study the relationship structure and behaviour of apparel firms. According to Grabber (1993), the structural embeddedness possesses four essential characteristics: reciprocity, interdependence, loose couplings, and asymmetric power relations. The reciprocity refers to recurrent transactions that are based on mutual expectations developed over several years of relationships. The interdependence refers to the elements of trust that enable firms to share critical resources and information. The loose coupling is the ability of firms to shift their resources as necessary. The asymmetric power relations lead to the dominance of one firm over the other due to such reasons as the economy of scale, lock-in effects etc. In this paper, the term embeddedness has been used to refer to the notion of structural embeddedness.

As stated earlier, our study is guided by these questions: What is the extent of embeddedness in the fixed income market? What is the relationship between a financial institution’s embeddedness and its trading cost and access to privileged information? What is the impact of a financial institution’s embeddedness on its perceived trust on alternative trading systems and the telephone system? Using the concept of structural embeddedness described previously, we propose our research hypotheses in the next section.

RESEARCH HYPOTHESES

Organizational theories predict that competitive dynamics among organizations results in a creation and distribution of similar organizations characterized with a high level of embeddedness (Hannan and Freeman, 1989; North 1990). As the landscape of the fixed income market is continuously changing due to the competition among issuers, portfolio adjustments by investors, innovations by providers of financial services, and improvements in risk management practices (BIS 2001), we postulate the following hypothesis:

H1: The fixed income market will be characterized by embedded networks rather than by an atomistic relationship.

Arm’s-length ties characterize the atomistic and socially detached market relationship. They are characterized by lean and sporadic transactions and function without any prolonged human or social contact between parties (Uzzi, 1999). They determine the degree to which an actor can access heterogeneous information in a market, even if that information is publicly available because actors use personal ties to search for opportunities and investments. Embedded ties are the manifestation of reciprocity and interdependence of structural embeddedness (see the earlier discussion on embeddedness in financial institutions). These ties are different from arm’s-length ties in that commercial exchanges among actors are embedded in social attachments and affiliations which inject into business exchange expectations of trust and shared norms of compliance (Uzzi and Gillespie, 2002). Thus, expectations of trust can increase the predictability with which exchange partners share private knowledge and believe that the costs and profits of their transactions will be shared to their mutual benefits. Embedded ties furnish governance and access to private information benefits that can channel resources and motivate attempts at integrative solutions to trading problems that are not available through arm’s-length ties.

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3 Habermas's theoretical system is devoted to revealing the possibility of reason, emancipation and rational-critical communication latent in modern institutions and in the human capacity to deliberate and pursue rational interests.
Oftentimes embedded ties can lead to “thicker information”, fine grained information transfer, and joint-problem solving arrangement. Thicker information is the type of information that can promote learning and integrated production in ways that the exchange of pure price data cannot. Fine-grained information transfer refers to the fact that information exchange in embedded ties is more proprietary and tacit than that in arm’s length ties. Such a transfer includes the strategic and tacit know-how that boosts a firm’s transactional efficacy and responsiveness to the environment. Joint problem-solving arrangement refers to the ability of actors to coordinate functions and work out problems “on the fly”. At the network level, institutional investors are more likely to get access to privileged information and receive best execution if their network of dealer ties has a mix of embedded ties and arm’s-length ties. These network effects arise because embedded ties motivate networks partners to share private recourses, while arm’s-length ties facilitate access to public information on market prices and trading opportunities so that the benefits of different types of ties are optimized within one network (Uzzi and Lancaster, 2003; Montazemi and Siam, 2006). Hence, we postulate the following two hypotheses:

**H2:** The more a buy side firm’s order executions (business) with a dealer are embedded in social networks, the more favourable are the firm’s trading cost (in the sense of best execution).

**H3:** A firm’s likelihood of acquiring privileged information increases when it has a network with a mix of embedded ties and arm’s length ties and that it decreases when it has a network that ends toward either solely embedded ties or solely arm’s length ties.

The social impact of a communication medium depends on the social presence of communicators enabled by the medium as proposed in the social presence theory (Short, Williams and Christie, 1976). Montazemi and Siam (2005) notice that the fixed income market is built around exploiting information asymmetry and that the telephone remains the primary mode of information flow between buyers and sellers as it preserves such asymmetry. Actors in the FI market access privileged information by exploiting their personal ties and social structures (Montazemi and Siam, 2006). Alternative trading systems, which are electronic trading systems precluding the use of the telephone system, are disruptive to the FI industry structure because they do not uphold its information asymmetry. They also minimize the role of structural embeddedness in acquiring privileged information (Gallaugher, 2002). A higher level of structural embeddedness enables financial institutions to participate in bigger FI transactions (in terms of dollar amount). Trust and mutual understanding among actors play important role in those critical transactions (SIFMA, 2008). In a recent study of the Canadian FI trading environment, Montazemi and Siam (2005, 2006) find that almost 95% of all FI trading is done through the telephone system. They also notice that the adoption of ATS in Canada is far behind than that in the US and Europe. In this context, it is reasonable to hypothesize that a high level of embeddedness tends to increase the reliance on the telephone system and decrease the reliance on the ATS for FI trading. Hence, the following:

**H4:** The level of structural embeddedness is negatively associated with the users’ perceived trust on alternative trading systems.

**H5:** The level of structural embeddedness is positively associated with the users’ perceived trust on the telephone system as the primary mode of communication.

**RESEARCH METHODOLOGY**

A comprehensive survey consisting of both structured and unstructured questions has been developed and sent to senior managers, sales representatives, and traders from major Canadian financial institutions for their participation. The survey collects data pertaining to the functional attributes and perception of the fixed income trading systems (e.g., trading platform types, minimum and maximum transaction size, real-time availability of data, and their perceived usefulness, efficiency, reliability, trustworthiness etc.), demographics of the systems users (e.g., education level and background, years of experience etc.), and institutional characteristic (e.g., market share, transaction size and frequency, types of debt securities etc.). In addition to the survey questionnaire, this study uses ethnographic data and face-to-face interviews to obtain additional insight into the technology usage and operation of the trading systems in the fixed income market.

As stated earlier, this study expounds on the notion of structural embeddedness. As indicators of embeddedness, researchers have used constructs such as duration (Uzzi, 1999; Seabright, Levinthal and Fichman, 1992), multiplicity of relations (Seabright et al., 1992), transaction size (Baker, Faulkner and Fisher, 1998; Uzzi, 1999) and first order network coupling (Baker, 1990; Uzzi, 1996) in the past. In this study, we intend to use the following data to assess the level of embeddedness: number of traders covering an account, number of sales representatives covering an account, experience, education, and seniority of the people serving the account, account size, average trade size by the client, length of the relationship,
complexity of the relationship, types of services provided, frequency of analyst coverage (daily, weekly, monthly, yearly),
frequency of contact (daily, weekly, monthly, yearly), and frequency of transactions (daily, weekly, monthly, yearly). In a
manner similar to Uzzi (1996), we compute the first order network coupling as $J = \sum p_i^2$ where $p_i$ refers to the proportion (of the
overall transaction) of a debt security $i$ of a financial institution available for trading in the FI market. This number
approaches 1 as an institution’s transactions become concentrated in a few instruments, which is an indication of the lack of
multiplicity of products. By using Principal Component Analysis or any other appropriate variable reduction method, we will
find out which variables can be retained as a measure of embeddedness. The score from such analysis will be used as an
assessment of the level of an institution’s embeddedness.

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