MARKET FORMATION AND FIXED INCOME E-COMMERCE

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ABSTRACT

The fixed-income markets are enormous, however innovation in this sector has trailed that in the much smaller equities markets. Recently, a number of alternate trading systems (ATS) have been introduced, many of which use the Internet as an enabling infrastructure. Despite the size and impact of these markets, there is a surprising lack of IS research in this field, yet the context provides a potentially fruitful test bed for e-commerce and market formation theory. This work introduces the motivation / ability framework for considering the likelihood of organizations in succeeding at forming fixed-income e-commerce markets, offers a theory-based discussion of the challenges and opportunities for firms seeking to create fixed-income ATS, highlights issues of system ownership, and uses examples to illustrate evolutionary trends.

Keywords: Electronic Commerce Business Models, Fixed-Income Financial Markets, B2B, Alternative Trading Systems

1. Introduction

The Fixed Income, Currencies, and Commodities Markets (FICC), commonly referred to as the fixed income markets, presents a tremendous opportunity for IS researchers to examine the issues associated with electronic market formation and inter-market competition. Several factors reflect the attractiveness of examining this context. First, the fixed income markets are massive with enormous daily trading volumes. US bond markets alone are valued at over $15.1 trillion dollars, with daily trading volume of roughly $365 billion (Bond Market Association, 2000). Daily trading volume in the currency foreign exchange markets is $1.5 trillion dollars, roughly equivalent to one month's worth of NYSE and Nasdaq volumes. Second, these products are entirely digital. Financial markets rely heavily on information and are ideal candidates for migration to electronic markets (Bakos 1998; Shapiro and Varian 1998). Third, fixed income markets are diversely competitive and are less automated with respect to their equity counterparts. While one can turn to stock markets to gain an immediate picture on pricing and buy-sell activity, there are not similar centralized market mechanisms in the highly fragmented fixed income space. Electronic versions of these markets are being launched by a wide variety of competitors representing buy and sell-side consortia, independent, established third parties, and startups. While the most significant activity in these markets involve corporations as counterparties (and hence can be classified as business-to-business or B2B markets), players include a broad array of firms including corporate treasurers and issuing firms, investments banks, and institutional investors (e.g. mutual fund and pension managers). When compared to the equities markets that most investors are familiar with, fixed income markets are at a relatively early stage of electronic market formation, yielding opportunities to examine broader IS and market formation theory as competition unfolds. The value, player diversity, and nascent development stage of many of these markets are likely to yield broad practitioner interest in examining this context. However, despite the compelling reasons for examining this context, there is a dearth of IS research in this area.

Understanding the development of new electronic market mechanisms and alternate trading systems (ATS) is critically important to all participants in fixed-income markets. The evolution of these systems may displace current incumbents or strengthen their dominant positions, all while increasing efficiency in the market's value chain. While fixed income systems are at early developmental stages, the use of e-commerce systems for the fixed income market has grown substantially. Undoubtedly, the Internet has been a catalyst for this trend. While early electronic market theory suggested that the expense of developing such systems would limit innovation (Malone, Benjamin, and Yates, 1997; Bakos 1991), the Internet has changed this hypothesis by offering a robust and ubiquitous infrastructure that lowers the cost of system development and deployment (Auger and Gallaugher, 1997; Bakos 1998). Confidence in the migration to Internet-based trading seems to be high, despite the high dollar volume of most fixed-income transactions. A Greenwich Associates survey of 500 of the largest Treasury investors reported that 21 percent now trade Treasuries electronically and that number is expected to jump to 50 percent in the next few

years (Gutner 1999). A similar poll identified that 46 percent of institutional investors expected to be trading over the Internet within two years. Those traders already using the Internet expected to increase the proportion they trade online within two years from 13 to 22 percent on average (Wood, 2000). In order to better understand the sea-change that is occurring to enable this increased trading activity, this work will synthesize the literature and provide examples that examine the challenges related to automation in the fixed income markets, the evolution of such systems, and the forces at work that may enable or hinder migration to the various types of ATS.

2. Types of Systems

In this early experimentation phase, numerous systems have been introduced that allow for the electronic execution of fixed income securities. By November 2000, the Bond Market Association had identified 68 bond-related fixed-income trading systems in the U.S. and five operating exclusively in Europe. This is up from just 11 in 1997 (Bond Market Association, 2000). While many of these systems started as proprietary, closed networks, the Internet has increasingly become the infrastructure of choice for deployment. Although each system has its own design and protocols, the Bond Market Association has characterized these systems into four distinct categories.

In *single-dealer systems*, investors execute transactions directly with a specific dealer of choice, with the dealer acting as the principal in each transaction. Purchases are typically made from the dealer's inventory. The goal of these systems is to leverage electronic systems to increase the efficiency within a dealer's existing channels, while attracting new customers or preventing loss to rivals.

Multi-dealer systems allow customers to consolidate orders from multiple dealers and execute orders among multiple quotes. Participating dealers generally act as principals in transactions. Such systems may display the best bid or ask price for a given security among all the prices posted by participating dealers. This offers additional efficiency to the consumer by enhancing the distribution channel via increased competition and offering selection at the point of purchase (Andersen et al, 1997).

Inter-dealer systems allow dealers to execute transactions electronically with other dealers through the fully anonymous services of brokers. A number of interdealer brokers have introduced electronic transaction systems that will allow dealers to execute transactions anonymously.

Auction systems enable participants to conduct electronic auctions of securities offerings. Auctions are used both to bring new issues to market (the primary market) or to allow for the trading of shares in secondary markets post-issue. Auction markets imply a level of sophistication among participants to be able to determine the fair value of the instruments offered. In addition to transactional efficiency, these systems can create additional efficiencies through transparency by allowing bidders to improve bids during the auction period if such systems enable the viewing of competing bids from other participants.

Cross-matching systems allow participants to execute complex trading strategies incorporating multiple orders of different securities. These systems bring together dealers and institutional investors in systems that attempt to facilitate matches between buyers and sellers and in most cases ensuring participant anonymity. Users may enter trading strategies to be matched when a counterparty is found – either through real-time or period matching. Some systems allow parties to negotiate the terms of trade.

Little, if anything, is known about the factors that influence the nature of organizational participation in electronic markets (Alba et al. 1997; Gerwal et al., 2001). Developing an understanding of the nature of organizational participation would also enable market makers to craft more attractive markets for participant organizations. Benefits would also help the venture capital and investor community. The recent run up and subsequent collapse of publicly traded Internet-based business-to-business firms reflects this lack of understanding. Examining the early-stage development of fixed income markets allows us to provide a theory-based assessment of the factors involved in crafting such efforts.

3. Electronic Market Creation

Prior research has suggested that third parties (i.e. organizations that are neither a buyer nor seller) would have an advantage in creating electronic markets (Bakos 1991; Gerwal et al., 2001). However, current events seem to challenge this hypothesis. Some of the more successful B2B markets for providers of physical goods, such as those run by General Electric and Volkswagon, are those sponsored by counterparties (InformationWeek 2001), while many third party efforts have suffered.

It may be more effective to consider the role that motivation and ability play in determining the likelihood that an organization or consortia will be able to create and sustain an effective electronic market (Gerwal et al., 2001). Stagnancy in market formation may be the result of a catch-22, those firms with the ability (e.g. key resources such as customers, brand, deep pockets, know-how) to create electronic markets may not be motivated since the new markets may pose a threat to existing profits. While some management literature suggests that innovative firms may

craft market distorting disruptions (Christensen 1997), there are very few examples of startups that have built successful e-markets in the B2B space. One may argue that it is precisely because these firms, although highly motivated, lack the ability in that they do not possess the key assets of the adversaries they seek to depose.

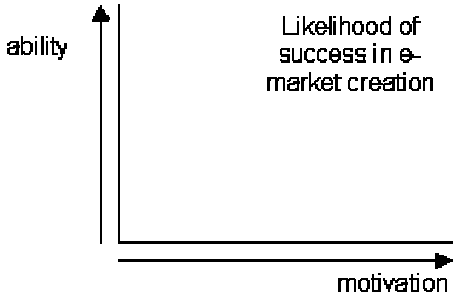

Figure 1: Ability / Motivation as a Function of e-Market Creation

Such stagnation seems to be limiting innovation in the fixed income space. The equities markets have seen an explosion of automation. These efforts have brought such dramatic shifts to world markets that some bourses are dropping floor exchanges, while the largest exchanges in the United States have plotted radical moves including the deployment of new information systems and their own public offerings. The U.S. fixed income market however has not seen comparable advancement. Several factors create barriers to automating fixed income markets. These include complexity, channel pressure, value gaps, and a variety of issues associated with system ownership. Each is explored from a theory and contextual perspective below.

4. Complexity

One reason that fixed income markets have lagged in electronic market formation is that these markets are much more complex than their equity kin. Electronic trading systems work best when the types of products being traded are homogeneous and easily substitutable (Benjamin et al., 1987; Bakos, 1991). However, in the broader US bond markets there are more than 4.4 million distinct issues outstanding, each of which has a different combination of structures, credit ratings, coupons, maturities, payment schedules, and security features (Bond Market Association, 2000). These markets have historically traded over-the-counter with market participants executing transactions through voice contact. The IS literature shows that usability is a critical component of adoption of new information technologies (Rogers, 1995), however crafting an interface to deal with complex trading environments can be an extraordinary challenge. Consider the case of Optimark (Clemmons and Weber, 1998). Large trading blocks create visible exposure and vulnerability. The Optimark system was targeted at fund managers and other institutional investors who regularly see markets move counter to their position as soon as their trading intention becomes known. The system was targeted at providing an anonymous trading mechanism for large blocks of trades, promising to target what many traders saw as a significant reason why many institutional investors fail to match the performance of simple indices. The Optimark effort failed largely because of the complexity involved in the system's user interface and the adoption challenge in obtaining the behavior changes necessary for acceptance among institutional investors (Propson, 2001). Equities markets are relatively structured compared to the diversity in bond and other fixed income markets, so a system attempting to unify the disparate equities markets would be extraordinarily difficult to develop, given the breadth and differences of various instruments. For this reason we've seen a number of more focused efforts that specialize in segments of related fixed income products.

5. Channel Pressure

There is also a problem with channel pressure (Gallaugher 2002). Sell-side firms have traditionally played a critical role in fixed-income markets. On negotiated deals (comprising roughly 75 percent of bond issues) sell side firms provide critical expertise that is difficult for an electronic network to capture. This expertise constitutes an information asymmetry (Clemmons, 1997) that has worked as a source of competitive advantage for investment banks. For both negotiated deals and the more competitive auction-based systems used in the Treasuries markets, the sell side has also classically provided distribution channels that help an originator of fixed-income instruments like bonds to rapidly disseminate product. Even in more straight-forward, auction-type placements (the remaining 25 percent of the bond markets), sell-side firms are hesitant to readily embrace systems that would allow spreads to fall, margins to erode, and brokers to be disintermediated.

6. Value Gaps

The critical importance of the distribution channel along with the expertise that is difficult to replicate in electronic systems also create a value gap (Gallaugher 2002). Value gaps exist when the new channel offers less aggregate value than the previous channel, and value gaps in areas critical to supporting the value chain or which eliminate sources of competitive advantage can doom an effort to failure. Firms often expose themselves to value gaps by focusing on eliminating quantifiable economic cost, while discounting or ignoring unpriced yet vital assets held in the prior channel, such as brand and relationships. Although an electronic solution may seem attractive from a purely economic perspective, fixed income markets rely heavily on client relationships, reputable deal making capabilities, and strong distribution channels. The elimination of functions within a value chain may remove difficult to quantify benefits that are nonetheless vital to the process. For an example of these pressures hampering automation in financial markets we'll look again to efforts on the equities side. W.R. Hambrecht has attempted to remove economic inefficiencies in the IPO market by creating a direct-to-consumer issuing process called Open IPO. This system promised to distribute initial public offering shares more broadly to consumers through an auction mechanism, all while lowering underwriting costs and eliminating the gap between the issuing firm's take and the typically higher price that retail investors are willing to pay. However, Open IPO has not received a strong initial reception because firms lose key value from the former channel including the prestige of going public through a bulge bracket investment bank, a perception of reputable due diligence in initial price setting, and the associated analyst coverage and institutional relationships that can help maintain interest and a liquid environment after issue.

7. Platform Ownership

The diversity in fixed income markets has led to ATS evolution along different paths and different types depending on the characteristics of the system (Wood, 2000). Liquid, simple products like government bonds are, not surprisingly, among the most automated with respect to alternate trading systems (Malone, Benjamin, and Yates 1987). Following this innovation is a wave of increasingly complex products such as interest-rate swaps, that are more suited for a reverse auction. It is unlikely that all components of the fixed income market will migrate to ATS and very complex products where trust and expertise are critical will likely continue to remain reliant on voice contact. The evolution of systems across these tiers is being championed by a variety of different platform owners. The advantages and disadvantages of new, incumbent, and consortium led-efforts are critical for managers to understand and will have a key impact on the success or failure of any effort. These issues are detailed below.

Startup Third Parties

Market creation theory has suggested that markets developed by a neutral third party (neither a buyer nor seller), would dominate (Bakos 1991; Gerwal et al., 2001). However, the B2B e-commerce bubble of 1999-2000 has left many independents bankrupt. It remains to be seen if independents in the fixed-income space will suffer a similar fate. As digital products, logistics issues associated with product delivery of physical goods are largely eliminated (Bakos 1998). Firms participating in financial markets are already familiar with market mechanisms and volumes may be large enough so as to allow market makers to exist off of narrow margins, avoiding the perception of price gouging that so negatively effected many startup markets in physical goods markets.

In fixed income markets, independent markets run by neutral third parties help quell the perception that an ATS is biased against a constituency of the exchange process. This may be particularly important in financial services where participants are sensitive to any perception of a conflict of interest between the buy-side and sell-side. As an example, while some of the largest banks involved in foreign exchange have announced online networks to pool activity in this fragmented market, one of the early leaders in this space is CurreneX, an independent exchange unaffiliated with bank partners. By Fall 2000, many institutional investors as well as treasurers at firms such as MasterCard were completing half of their foreign exchange over CurreneX's web-enabled system. CurreneX's CEO Lori Mirek claims the site's neutrality is one of its chief advantages, stating "Clients tell us that they don't want their counterparty also to run the platform" (Wood, 2000). The foreign exchange market may be more appropriate for electronic trading as it has a number of attributes that make electronic exchange formation desirable including a standard product, volume, and a fragmented marketplace (Bakos, 1991; Sawhney and Kaplan, 2000). The fragmented nature of the market may allow a new middleman to extend the channel or replace inefficient mechanisms for institutional forex trading in the way that Charles Schwab was able to revolutionize the retail mutual fund market with its OneSource network (Bejamin and Wigand, 1997). Third party marketplaces may have an advantage in encouraging participation in a fragmented market, given that suppliers may be more likely to join an open market rather than one controlled or financed by rivals.

Despite these advantages, third party marketplaces may suffer from limitations in key resources necessary for jump-starting the ATS, such as brand awareness, trust, profit-centers in other businesses to fuel expansion, and trading partners necessary for liquidity. Also, while fragmented, disorganized markets offer great opportunities for

rooting out inefficiencies and enlisting potential trading partners in a neutral, independent site, third party marketplaces operating in industries where there are dominant rivals also face a fast-follower problem (VanderWerf and Mahon, 1997). Some participants may use the ATS as a learning tool and a gauge for the validity and interest in electronic marketplaces. Once the concept is proven and parties are comfortable with the option, then firms may seek to develop their own systems independent of the third-party. While third parties that acquire liquidity in fragmented markets may have a more defensible position, third-party marketplaces that are reliant on large participants are extremely vulnerable. Many new ATS are formed from technology firms migrating platforms to the web and re-crafting software as a service. The web-based efforts of both Currenex and CPMarkets evolved from software firms offering proprietary products.

Third-party Incumbent Systems

Incumbents are worth discussing as distinctly different from startups in that they have key assets the startups do not. These include brand, stability, slack resources, and customers. Each of these represent key resources difficult for others to copy. Following the resource-based view of the firm, technology rarely represents a source of competitive advantage, rather its the unique set of resources a firm creates or leverages through the use of technology that enables IS to be truly strategic (Mata et al. 1995). In single-dealer systems, an incumbent creates their own alternate trading system. This is an attractive option for large firms that dominate markets and that are able to single-handedly aggregate market-influencing power. Such systems may also instill a switching cost that is difficult for rivals to unseat (Shapiro and Varian, 1998). As the Internet lowers cost and increases accessibility, new tools and standards will allow proprietary systems to be expanded and migrated to open networks. Large entities can provide scale in aggregating buyers or sellers and can provide the liquidity jumpstart necessary to launch an exchange, however controlling firms may eventually choose to open to others if greater sum gains can be retrieved.

Gerwal et al., (2001) contend that strategic considerations such as providing better customer service (Parasuraman and Grewal 2000) and competitive hedging and/or preemption (Dickson 1992) gain significance in the organizational decision to participate in electronic markets. Preemption can be particularly strong if the incumbent has resources that can be leveraged to maintain its market share. Some firms may be willing to execute a preemption strategy, even if it means an erosion of core business (preemptive cannibalization) if there is a significant threat that failing to cannibalize the firm's own market will result in loss to a rival. Such a tactic was adopted by bond trader Cantor Fitzgerald, formerly the leading broker in US Government bonds. Cantor created eSpeed, an electronic system for bond trading, that resulted in a roughly 90% reduction in the number of bond traders. Within two years, eSpeed became the de facto exchange for U.S. Treasury securities, with about half of the $300 billion in daily trades taking place on its system (Ante 2001)[1]. eSpeed was created as a separate organization, yet Cantor maintained majority ownership. Strategic considerations motivate organizations to build capabilities and preempt competition and thereby to serve customers better (Day and Wensley 1988; Slater and Narver 1995) Creating a separate firm isolates the startup endeavor from the parent and allows the parent to hedge risk, while providing the new endeavor with access to resources of the parent (Christensen 1997; Downs and Mui 1998).

Such preemption may be particularly pressing in environments where switching costs can be created. The study of the strategic implications of switching costs has emerged as an active field in economics, highlighted significantly in the work of Klemperer (1987a, 1987b), and von Weizsaker (1984), among others. Analytical models of switching costs usually predict aggressive behavior of early movers, who try to build a locked-in customer base that can be subsequently exploited. It is often assumed in the IS literature that interorganizational information systems create substantial switching costs because of sunk investments in hardware, software, user training, and organizational changes, as well as non-technology barriers such as trust in organizational partners or long-term contracts (e.g. Bakos and Treacy, 1986; McFarlan, 1984). Unless technology evolves in a way that subsequently penalizes early movers or removes access barriers between different systems, late movers are at a disadvantage.

Consortia

Liquidity is essential to creating the demand necessary for most ATS efforts. Leverage exerted by a group of firms that can bring together a customer and supplier base to ensure liquidity can yield enormous market influence (Porter 1985) and generate positive-sum network effects (Farrell and Saloner 1985). The ability of large consortia to wield power in purchase or supply can crush even those rivals with an early lead. Despite the early success of Currenex, the firm is undoubtedly concerned with efforts being launched by some of the largest banks participating in the forex market. In June 2000, a consortium of 13 banks announced a plan for their own currency exchange

[1] Amidst great tragedy, the shift to electronic systems allowed Cantor ownership to maintain a position of strength in the bond market. Located on high floors in the World Trade Center, the firm lost nearly all of its headquarter staff as a result of the events of September 11th, 2002. Yet eSpeed was trading again within two days of this terrible loss (Fortune 2001).

called FXall. In August 2000, Citibank, Chase, Deutsche Bank, and Reuters announced the similar Atriax effort[2]. The brand, scale, and complementary resources that these efforts may bring to market may be formidable. While FXall and Attriax were pioneered by large banks with substantial forex business, consortia may also be formed by smaller firms hoping to generate the scale to challenge incumbents. A successful early system enjoying network externalities may leave no alternative to other industry participants but to form a coalition and offer a credible competing system (Bakos 1991). There is an example of such collaboration on the equities side with Internet brokerages cooperating in supporting Knight/Trimark. In 1995, some 27 online discount brokerage firms flocked to the newly created firm that specialized in serving Internet-based discount brokerages – many held an ownership stake in the firm. Within three years, Knight became the Nasdaq's largest market maker, an unprecedented growth fueled largely by the combined scale of smaller participants.

Firms may seek to forward integrate in distribution channels when the cost of distribution is large (Porter 1985). Such is the motivation behind CPMarket, a market by the Direct Issuers' Working Group, a US trade association for firms that issue their own commercial paper. By mid-2000, CPMarket had 18 companies and more than 200 institutional investors signed up to the service. While efficiencies have been a motivating factor for the system, many issuers of multi-billion dollar commercial paper programs such as Ford and Daimler Chrysler have noted a broadening in their investor base. Firms in CPMarket also benefit from improved communication and an ability to experiment with to different rates.

Sustainable advantage based on information technology typically requires leveraging unique resources that cannot be easily replicated or leapfrogged by potential competitors (Clemons and Row 1987). Scale and scope can be considered such resources. Both startup and incumbent systems may lack signifcant scale and scope advantages. Bakos (1991) lists four areas where economies of scale and scope may arise: 1) building and managing systems of substantial size and functionality relying on complex communication networks, requiring large investments in sunk costs and specialized expertise; big intermediaries can leverage this investment over a larger number of system participants; 2) system development, which is often characterized by a steep learning curve that allows the development of subsequent systems at a smaller cost; 3) economies of scope, especially in development expertise, the sharing of operational facilities, and data collection (where data collected during system operation becomes a valuable asset); and 4) network externalities as the number of participants in an electronic marketplace increases and the market becomes more successful, providing more benefits (e.g. liquidity) to its individual participants.

The success of electronic markets depends not only on the characteristics of the market maker but also on the value the market provides for participant organizations (Gerwal et al., 2001). While it is recognized that network effects are vital to creating market liquidity, much economic and IS literature has defined network effects in terms of installed base (Farrell and Saloner 1985; Brynjolfsson and Kemerer 1997). However, it is important to note that users may adopt a network, increasing the installed base, but not trade, resulting in a lack of liquidity. Such a concept is representative of assimilation gaps outlined by Fichman and Kemerer 1999. Some organizations adopt electronic markets as a mere pretense to attain legitimacy (DiMaggio and Powell 1983; Scott 1987). Gerwal et al., 2001 suggest conniving the passive participants to expand resources to become full-fledged participants in that this may be in the best interest of a market maker in the long run. However, many markets are challenged to do this. In some markets, more participants lower prices for sellers and discourage adoption or continuance.

Bakos (1991) has suggested that the best strategy for sellers may be to control the type of system that is eventually introduced. If sellers orchestrate the introduction of systems that emphasize product rather than price information, buyers will use these systems to locate the most appropriate product in the market. Sellers would be able to maintain their profits and in addition appropriate some of the buyers' benefits through user charges. However, it is important to note that this may not be possible if the gap between systems offered by sell-side & others (buy-side or third parties) is obvious and if rival markets can attract enough sellers to create a viable market.

While consortia of firms cooperating together provide an example of rivals creating a positive-sum game capable of generating benefits for all (Brandenburger and Nalebuff, 1997), consortia may suffer a number of formation difficulties. Mistrust, cultural differences, standards issues, control concern, and other factors can lead to delays or even the cancellation of cooperative efforts. An exchange created by a single entity may benefit from focus that consortia find difficult to achieve and the downside of cooperating with industry competitors has pushed many large players to simply act alone. And while network effects fuel positive growth, network markets also exhibit market dominant tendencies that raise concerns among anti-trust regulators. The SEC and FTC are particularly concerned that participants could band together to influence markets, and a number of consortia-based

[2] The Atriax effort folded in April 2002, less than a year after launching online trading. While earlier failed ATS efforts, such as the 2001 collapse of CFOWeb, indicated the vulnerability of independent startups, the Atriax failure demonstrates that even consortia-led ATS backed by large liquidity providers may suffer in a market shakeout.

fixed income efforts were contacted by the US Justice Department in late 2000 / early 2001 as part of an initial fact-finding probe. Bakos (1991) also notes that actions taken by bond dealers in the late 1980s to protect these profits caught the attention of authorities, leading to regulation that ultimately lowered profitability in the field.

Finally, firms may be concerned to the extent that resources and influence are transferred to any entity created by the consortia. The creator of such a market would in effect extend the channel and the dynamics of channel extension and the resultant power shifts may be significant (Gallaugher, 2002). Participants in a marketplace that allow their systems to be aggregated by another entity engage in a devil's bargain. In most cases, suppliers pay the exchange operator a premium to participate and increased competition can also lead to price reduction – both of which erode margins. Suppliers engage in a margin for volume trade-off, hoping to surpass the shortfall by increasing their transactions and/or customer base. Additionally, suppliers may see brand value transferred to the exchange operator as participants think first of the ATS rather than the supplier. Since dealers are further displaced from their customers, this may negatively impact personalization and experimentation efforts. And increased competition leads to a further commoditization of services.

Hubs

It may be unreasonable to imagine a large, uber-market evolving in FICC markets, given the broad diversity of the fixed income space. Electronic trading has been most successful in the US Treasury market where parameters are much more clearly defined – there is a single, well-known issuer, enormous volume, and strong supporting data. Contrast this with the municipal market which has more than 50,000 different issuers and consists of almost 1.5 million different issues, each with different structural characteristics (Bond Market Association, 2000). The mortgage-related market has almost 2 million different issues, while corporate debt instruments account for an additional 300,000 issues. While the characteristics of these systems are sufficiently disparate to make a unified market unlikely, one possible solution is an aggregator of other platforms. Such a hub would allow for institutional and other investors to access separate systems through a single point of contact – ideally with a unified login and clearing mechanism.

Such hubs act as central distribution platforms that aggregate other ATS that either the hub owner controls or that are provided by other parties. Securities.Hub allows institutional investors to shuttle among the six major dealers' web sites with a single log-on and password. At the central Bond.Hub for example, they can see listings of new research and price quotes by all firms, moving to each dealer's web site if they want to see more or negotiate a transaction. Securities.Hub is deliberately limited to six major players to avoid marginal contributors or free-riders from having access to the client list of elite firms (Smith, 2000). Institutional systems providers such as Bloomberg, Telerate, and the old BRIDGE system have also functioned as distribution channels for a number of fixed-income ATS offered by competing firms. ATS that combine their resources may create even stronger network effects, however there may be a similar transfer of strength and influence to the hub operator as was outlined above in the consortia devil's bargain. Over time such hubs may evolve with greater integration among the disparate systems provided.

8. ATS Innovation: Innovator Alignment

To understand which firms are likely to innovate with new ATS, it is important to recognize how these innovations are supportive of, or are at odds with, a firm's existing business models. Gerwal et al. (2001) would refer to this as the organization's motivation for development of the electronic market. Companies whose resources, processes, and values are sustained by the Internet and other e-commerce systems have a distinct advantage over companies for whom the Internet is disruptive (Christensen and Overdorf, 2000). Reliance on high margin distribution channels that exploit information asymmetries are inherently incompatible with e-commerce systems that focus on market efficiency. As such, this makes innovation a far greater challenge among traditional investment banks. Consider the retail investing side. Virtually every major discount broker has made the transition to the Internet because this technology enabled them to discount better. Full service firms like Merrill Lynch, however saw the technology as a threat and have had great initial difficulty crafting complementary models. We are beginning to see a similar dynamic played out as direct-to-retail bond sales grow in popularity. Since there is no required reporting of bids and offers in $13 trillion over-the-counter bond market, investors are at a fundamental disadvantage. Championing a democratization of this market, Schwab and E*Trade have begun making bond trading available over their web sites at much lower margins that previously offered. E*Trade's markups of one half to three-quarters of a percentage point are significantly less than the one percent to three percent for a discount or full service broker.

Perhaps those firms providing the greatest danger to would-be market makers are those with markets in complementary products that are willing to lose money in one market to fuel expansion of another. It has been demonstrated that vendors of IT may offer some products for free in order to spur markets in other areas and that

such free pricers can lead to significant market distortions (Gallaugher and Wang 1999). Such is the case for web browser & web server software. State Street Corporation provides an example of this from the fixed-income space. State Street's ATS include the firm's GlobaLink and FX Connect foreign exchange systems, and the Insight portfolio management system. State Street's existing model is highly complementary to leveraging the Internet as an enabling infrastructure. The firm is one of the world's largest financial custody providers, holding roughly 10 percent of the world's assets under custody and facilitating some 12 percent of all daily foreign currency exchange. However, the firm has largely shed itself of traditional banking activity and instead focuses on systems that support custody for most of the nation's largest mutual funds and pensions. As a result, the firm was able to aggressively leverage its scale and market knowledge into higher-value systems without fear of destroying existing business. State Street gives away market intelligence decision support systems in an effort to further build brand, attract customers, and cross-sell more services. Customers who use Global Link already buy three times as many services from State Street as customers who don't, and selling additional services to institutional investors around the world is the company's principal engine for growth. State Street's top 100 clients now use 10.5 services each, up from 8.4 in 1995, the year after Global Link was launched, also representing more services per customer than the other custody providers (Cone 2000). Firms such as State Street that can afford to provide a free service that fuels complementary businesses may pose the greatest threat to firms seeking profits as market owners. As such, would-be market owners would be wise to perform a competitive analysis to see if there are potential players with complementary businesses that may be willing to undercut prices in market making activity in order to secure the benefits of a stronger relationship with traders.

9. Future Directions

This paper has presented a framework for considering electronic market formation based on motivation and ability, and has identified key issues that are hindering and enabling alternative trading systems in the fixed income sector. This massive market is undergoing enormous changes and it is hoped that the issues raised in this paper shed light on a diverse and disparately structured set of markets. The next step in this research is to develop a taxonomy of systems and issues and to verify the evolution of these systems, citing the timing and success or failure of various ATS. This work should help practitioners better understand the dynamics of e-commerce enabled financial market evolution and should provide a significant contribution to both the IS and finance literature.

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